METEOROLOGICAL OFFICE
27 OCT 1966
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MINUTES OF THE PROCEEDINGS

OF THE

METEOROLOGICAL COUNCIL,

1887—1888.

LONDON:
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FOR HER MAJESTY'S STATIONERY OFFICE.

1888.

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Office

MINUTES OF THE PROCEEDINGS

OF THE

METEOROLOGICAL COUNCIL.

1887—88.

116, *Victoria Street, April* 6, 1887.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

The Secretary was in attendance.

The Minutes of the last meeting (March 23) were read and confirmed.

Submitted—A correspondence with Mr. Cullum of Valencia, and Professor G. F. FitzGerald, F.R.S., with regard to certain magnetic observations which it was proposed should be conducted at Valencia by Mr. Cullum (Letters 534, 636, and 701).

It was resolved that permission be granted to Mr. Cullum to undertake the observations, provided that they do not interfere with his regular duties (P.C. 785).

Submitted the following report:—

SIR, Meteorological Office, March 31, 1887.

I HAVE the honour to report for the information of the Council on the work which has been done during the quarter ending 31st March 1887.

CURRENT CHARTS.

Indian Ocean.—The plotting of the currents contained in the Office logs for the months of June, July, and August, has been in progress. Special attention has been paid to the part of the sea adjacent to Cape Guardafui during the S.W. Monsoon in the months of June, July, and August, and for this all available information in our own logs has been discussed, as well as some valuable observations obtained from the Hydrographic Office. Large scale charts were prepared for this work, and the currents, temperature of the air and sea, wind, weather, and the direction of the sea or swell, are all shown on the charts.

Arctic Ocean (extending from the 60th parallel of lat. northwards).—The currents obtained from all available sources in the Office are being plotted for each month of the year. This work will be completed by the end of May.

Outline Charts.—Some time has been devoted to the preparation of outline charts for the Atlantic, Pacific, and Indian Oceans. Twelve of these charts have been drawn during the quarter.

PRESSURE CHARTS.

These charts are still in the hands of the printer. Three charts of the Pacific Ocean and four small charts of the world, showing the barometrical range, have yet to be printed.

I am, &c.

(Signed) C. W. BAILLIE,
Nav.-Lieutenant, R.N.

The Marine Superintendent.

Forwarded for the information of the Council.
H. T.

E 51035. 25.—4/87. Wt. 413. E. & S.

LIST of STORM WARNINGS issued to the BRITISH and IRISH COASTS since the previous Meeting of the Council, naming the Hour of Issue, the Coasts warned, the Signal hoisted, the Gales experienced, and the Result, as to the Character of the Warning.

1. WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signals hoisted.	Gales experieneed (if any), and Approximate Time of occurrence.	Result. — Character of Signal.*
1887.				
March 23rd, 7.30 p.m.	Ireland, S. -	South cone	Fresh Wly. to N.Wly. gales on 24th	A
" "	" E. -	"	Strong Wly. to N.Wly. winds on 25th	B
" "	Scotland, W. -	"	S.Wly. gales early on 24th - -	A
" "	England, N.W. -	"	Moderate W. to N.W. gales early on 25th.	B
" "	" W. -	"	" " "	B
" "	" S.W.	"	Moderate to fresh W. to N.W. gales on 25th.	A
March 26th, 10.40 a.m.	Ireland, S. -	South cone	S.Wly. winds, strong, to a moderate gale, evening 26th.	B
" "	" E. -	"	Strong N.Wly. winds, evening 27th	B
" "	Scotland, W. -	"	Strong gale, W., 27th - -	A
March 26th, 7.10 p.m.	England, N.W. -	South cone	Strong W. to N.W. winds on 27th -	B
" "	" W. -	"	" " " -	B
" "	" S.W. -	"	" " " -	B
" "	" S. -	"	" " " -	B
" "	" S.E. -	"	" " " -	B
" "	" E. (south of Hull).	"	" " " -	B
March 27th, 9.30 a.m.	Scotland, E. -	South cone	W. to N.W., moderate to fresh gales, evening 27th, and early on 28th.	A
" "	England, E. (north of Hull).	"	Strong W. to N.W. winds, evening 27th and early 28th.	B
March 31st, 9.50 a.m.	Scotland, E.(northern part only).	South cone	Strong N.Wly. gales and "whole gales" afternoon and night of 31st.	A
" 11.17 a.m.	" E. (remainder).	North cone	Strong N.Wly. gales, evening 31st -	A
" "	" W. -	"	" " " -	A
" 7.10 p.m.	England, N.W.† -	"	Moderate to fresh Nly. gales, night 31st and morning of April 1st.	A
" "	" E.† -	"	" " "	A
April 1st, 3.30 p.m.‡	Scotland, E. -	North cone	Moderate Nly. and N.Wly. gales, night of 1st.	B
" "	" W. -	"	Neither gales nor strong winds -	C
" "	Ireland, E. (and Galway).	"		C
" "	England, W. (part) -	"		C
April 5th, 3.35 p.m.§	Scotland, E. -	North cone	Neither gales nor strong wind -	C
" "	" W. -	"	" " " -	C
" "	England, N.W. -	"	Strong Nly. winds on 6th - -	B
" "	Ireland, E. -	"	" " ; a moderate gale at Donaghadee.	B

NOTES.

* The definitions for these letters are A = complete success ; B = partial success (*i.e.* justified by strong winds or moderate gales) ; C = failure.

† These signals, though justified, would have been of more practical value had they been issued a few hours earlier, but it did not appear probable at 3 p.m. that the gale would spread so far south, as the depression was then moving in a more Ely. direction than it did later on. The force of the Nly. wind over our Midland Counties and in London was much greater than that experienced either on our W. or E. coasts.

‡ This depression took a more Ely. course than was anticipated, and the gale was consequently felt in the N.E. of Scotland only.

§ This is a somewhat remarkable case. At 2 p.m. 5th, there was a moderate to fresh Nly. gale in the N.W. of Ireland and the Hebrides, and on the following day it spread to our S.E. and S. coasts. The intervening coasts, however, do not seem to have felt it (so far as our present observations show).

2. There were no severe gales experienced for which warnings had not been previously issued.

(Signed) FREDC. GASTER.

Telegraphic Branch,
6th April 1887.

Submitted—The following report on the forecasts for March 1887 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

MARCH.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	33	56	45	85
"	b	48	33	40	
"	c	19	4	12	
"	d	0	7	3	
Scotland, E.	a	44	52	48	82
"	b	37	30	34	
"	c	15	3	9	
"	d	4	15	9	
England, N.E.	a	48	45	47	85
"	b	33	44	38	
"	c	11	4	8	
"	d	8	7	7	
England, E.	a	33	52	43	87
"	b	52	37	44	
"	c	4	4	4	
"	d	11	7	9	
Midland Cos.	a	22	45	34	89
"	b	67	44	55	
"	c	7	4	6	
"	d	4	7	5	
England, S.	a	30	52	41	84
"	b	48	37	43	
"	c	15	7	11	
"	d	7	4	5	
Scotland, W.	a	30	33	32	76
"	b	48	41	44	
"	c	19	4	12	
"	d	3	22	12	
England, N.W.	a	37	48	43	74
"	b	33	30	31	
"	c	26	11	19	
"	d	4	11	7	
England, S.W.	a	37	56	47	86
"	b	37	41	39	
"	c	15	0	7	
"	d	11	3	7	
Ireland, N.	a	18	56	37	71
"	b	41	26	34	
"	c	26	7	16	
"	d	15	11	13	
Ireland, S.	a	37	56	47	72
"	b	33	18	25	
"	c	11	15	13	
"	d	19	11	15	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	32	62	47	89
"	b	52	32	42	
"	c	10	3	7	
"	d	6	3	4	
Scotland, E.	a	39	74	57	89
"	b	45	20	32	
"	c	13	3	8	
"	d	3	3	3	
England, N.E.	a	55	74	65	97
"	b	39	26	32	
"	c	6	0	3	
"	d	0	0	0	
England, E.	a	49	58	54	88
"	b	45	23	34	
"	c	3	16	9	
"	d	3	3	3	
Midland Cos.	a	49	55	52	94
"	b	42	42	42	
"	c	3	3	3	
"	d	6	0	3	
England, S.	a	42	52	47	86
"	b	49	29	39	
"	c	6	19	13	
"	d	3	0	1	
Scotland, W.	a	42	39	41	78
"	b	39	35	37	
"	c	13	10	11	
"	d	6	16	11	
England, N.W.	a	36	52	44	85
"	b	45	36	41	
"	c	16	6	11	
"	d	3	6	4	
England, S.W.	a	39	36	38	75
"	b	36	39	37	
"	c	19	19	19	
"	d	6	6	6	
Ireland, N.	a	42	52	47	85
"	b	39	36	38	
"	c	16	6	11	
"	d	3	6	4	
Ireland, S.	a	39	52	46	76
"	b	32	29	30	
"	c	10	3	7	
"	d	19	16	17	

SUMMARY.

British Isles	a	34	50	42	81
"	b	43	35	39	
"	c	15	6	11	
"	d	8	9	8	
British Isles	a	42	55	49	86
"	b	42	32	37	
"	c	11	8	9	
"	d	5	5	5	

Submitted—The following statements of work for March 1887 :—

MARINE ROOM.

April 5, 1887.

Examined 16 new logs and 1 lighthouse register.

North Atlantic Weather Charts.

Charts prepared and forwarded to the lithographer to April 9, 1883, and proofs of lithographed sheets to March 4 received.

Reduction of charts for May and June in hand. The charts prepared for reduction to the first week of August 1883.

Obtaining lowest barometer readings at centres of disturbances for June.

Measuring by planimeter the extent of areas under different atmospheric pressures, and obtaining the mean value of the barometer for the whole space.

General.

Discussion of Red Sea data. Admiralty logs and Remark books received for additional observations.

Copying a memorandum on Ascension Rollers, Letters M.O. 941 to 977.

Charts prepared for the Royal Meteorological Society Marine Exhibition :—

North Atlantic Synchronous.

Mean barometer and sea-surface temperature for all Oceans and Red Sea.

Copying observations from a rough book into log No. 6723.

Indexing data in ocean 10° squares.

The Marine Superintendent. (Signed) CHAS. HARDING.

Forwarded for the information of the Council.
(Signed) HENRY TOYNBEE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

(To 31st March 1886.)

Monthly Weather Report :—

1886, *October*, printed and issued.

„ *November*, revised and returned to printer "for press."

„ *December*, three fourths done.

1887, *January and February*, tables, rough maps, &c. all prepared.

Weekly Weather Report :—

1886, completed throughout and published.

1887, issued promptly to date. Preparation of Appendices is being pushed forward quickly.

Daily Weather Report.—1887, issued promptly to date, together with Corrections and Summaries of Observations for January and February.

Checking Daily (3.30 p.m. and 8.30 p.m.) *Forecasts.*—Complete to date.

Inquiry as to nature of the severe (partial) Gales felt on British and Irish coasts during the 15 years 1871–85 (for Prof. Stokes).

Daily United States Telegrams.—Plotted to date.

Preparation and revision of Reports on Storm Warnings issued in March completed, and copy handed in.

The preparation of the Monthly Weather Report and some other matters have been delayed, owing to ill-health of Mr. Brodie.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

April 1, 1887.

Observatory Returns.—The several mean results, and the hourly values of vapour tension, &c. for September 1884, have been calculated, and the Hourly Readings copied for the printer; the calculations for October 1884, are in hand. The proof of the August and September sheets have been revised, and Part III. "Hourly Readings, 1884," is practically passed for press.

Quarterly Weather Report.—The "General Summary" for Part II. 1879, is completed. The tables and the chart plates for Part IV. 1878 have been completed, and proofs of the latter received from the lithographer. Proofs of Part III. 1878 have been revised, and that number of the Report passed for press.

Harmonic Analysis.—The coefficients, &c. of pressure are being worked from the analyser results, for the years already dealt with in the machine, and the "result sheets" filled up.

Miscellaneous.—Some time was occupied in connexion with measurements of cloud photographs.

(Signed) R. H. CURTIS.

R. H. Scott, Esq., F.R.S.

Examination Branch.

April 1, 1887.

Examinations.

January 1885:—Three *thermograms*, three *barograms*, and four *anemograms*.
February 1885:—Three *thermograms* and three *barograms*.
Weekly examination (on receipt) of curves and documents from all stations.
Rainfall curves of Aberdeen, Falmouth, and Valencia, for 1886.

Reports, &c.

Notes of Errors to Aberdeen, Armagh (anemogram), Falmouth and Valencia for *December* 1884 and *January* 1885, and reports thereon to Council; also duplicate report for *October* 1884.
Investigation of Valencia and Falmouth dry and wet bulb differences (S—T), for March 1887.
Memorandum on the failure of the photography at Aberdeen, January and February 1887.

Miscellaneous.

Revising proof of forms 21, 22, 23, 26, 27, and 28 and report on the October 1884 work.
Preparing forms 29, 30, 31, and 37 for printer.
Sorting curves and documents from all stations, July—December 1886.

(Signed) T. E. Allen.

Read—A memorandum from Captain Toynbee, reporting that since the last meeting 10 logs had been received, 6 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. T. Barrett (the late.)	Bq. "Craigburn"	Feb. 22, 1886—Feb. 25, 1887.	Liverpool, Calcutta, and home.	—
Capt. A. S. Baxter -	"City of York"	June 11, 1886—March 14, 1887.	Cardiff, San Francisco, and home.	1886, p. 17.
Capt. James Clarke, R.N.R.	S.S. "Olbers" -	Sept. 16, 1886—March 17, 1887.	Liverpool, Rio Janeiro, New York.	1886, p. 64.
Capt. J. Ivor Dunbar.	S.S. "Arracan" -	Dec. 5, 1886—March 22, 1887.	Liverpool, Rangoon, and home.	1886, p. 88.
Capt. W. D. Fraser -	Bq. "Thomas S. Stowe."	Jan. 10, 1886—March 28, 1887.	Newport, Rockhampton, Victoria, B.C., and home.	1885, p. 74.
Capt. G. Janes -	"Middlesex" -	May 19, 1886—March 28, 1887.	Cardiff, Singapore, Chittagong, Dundee.	—

Mr. Scott was instructed to present the Charts O. 20 to the representatives of Captain Barrett, and O. 32 to Captain Janes, and to convey the best thanks of the Council to the other observers.

The increments to the "classified" clerks, referred to on Minutes, 1884–5, pp. 118–9 were allowed; the salaries which are changed for the current year are the following (See Minutes, 1886–7, pp. 13–14):—

Class I.—Maximum £275.

	Salary in 1887–88. £
J. A. Curtis - - -	220

Class II.—Maximum £200.

F. J. Brodie - - -	195
G. G. Francis - - -	190
T. D. Bell - - -	190
A. J. Rigby - - -	185
H. Harries - - -	180
W. Allingham - - -	180

Class III.—Maximum £150.

C. H. Thompson - -	150
S. Call - - -	140
W. G. James - - -	135
R. Sargeant - - -	130
J. Sheerman - - -	130

CLASS IV.—Maximum £110.

A. R. Simpkins	110
H. J. Stevens	110
R. F. Wallace	105
A. H. Bell	90
R. G. Canham	90

In the case of the unclassified clerks, the following alterations were made, to date from the 4th April, being an increase of :—

		£	s.	d.
E. J. Hood, to receive weekly,	+ 1s. 6d.	1	0	0
C. A. Bracey „	+ 1s. 6d.	0	18	6
H. G. Brown „	+ 2s.	0	16	0
L. H. Powers „	+ 2s.	0	15	0
C. Pycock „	+ 1s. 6d.	0	16	0

Reported—That the following cheques had been drawn during the month of March :—

1887.					£	s.	d.
March 5th.	J. S. Harding, jun., for payment of weekly salaries				15	3	0
„ 12th.	„ „				15	3	0
„ „	Wightman & Co., book post wrappers, &c.				9	15	6
„ „	Johnson, Matthey, & Co., nitrate of silver				4	17	0
„ „	H. Bond, office fittings and repairs				32	14	6
„ 19th.	J. S. Harding, jun., for payment of weekly salaries				15	3	0
„ „	E. Mascart, American reports*				31	10	11
„ „	Buys Ballot, Helder „ *				6	11	8
„ „	H. Martin, instruments				5	4	6
„ 26th.	Postmaster General, private wire	31	5	0			
„ „	„ telegrams	150	2	10			
					181	7	10
„ „	Kew Committee, verifications	12	10	0			
„ „	„ special researches	76	15	6			
„ „	„ postages, &c.	6	2	5			
					95	7	11
„ „	P. Adie, instruments and repairs				34	5	0
„ „	J. S. Harding, jun., for payment of weekly salaries				15	3	0
„ „	E. Mascart, French reports*				3	6	4
„ 31st.	General R. Strachey, R.E., salary	289	7	11			
„ „	Professor G. H. Darwin, fees	152	11	1			
„ „	F. Galton, „	135	1	8			
„ „	Professor G. G. Stokes, „	146	14	7			
„ „	E. J. Stone, „	146	14	7			
„ „	Captain W. J. L. Wharton, R.N., fees	92	11	5			
„ „	E. Davis, Council income tax	33	6	8			
„ „	J. S. Harding, jun., Council petty expenses	3	12	1			
					1,000	0	0
„ „	R. H. Scott, Secretary				66	13	4
„ „	J. S. Harding } "Office" salaries				27	15	6
„ „	T. D. Bell }				15	8	4
„ „	J. Sheerman, salary (harmonic analysis)				10	8	4
„ „	J. E. Cullum, salary (Valencia Observatory)				18	15	0
„ „	R. H. Curtis }				22	18	4
„ „	J. A. Curtis }				17	18	4
„ „	T. E. Allen }				16	13	4
„ „	C. H. Thompson } Salaries (discussion, &c. of observations).				12	1	8
„ „	S. Call }				11	5	0
„ „	R. G. Canham }				7	1	8
„ „	A. H. Bell }				7	1	8
	Carried forward				£1,699	13	8

* Payment made by draft on foreign banker.

1887.			£	s.	d.	£	s.	d.
		Brought forward - - -				1,699	13	8
March 31st.	F. Gaster -	Salaries (preparation, &c. of weather reports).				25	15	7
,, ,,	F. J. Brodie -					17	16	3
,, ,,	G. G. Francis -					17	6	10
,, ,,	A. J. Rigby -					16	17	6
,, ,,	R. Sargeant -					11	14	4
,, ,,	A. R. Simpkins -					9	16	10
,, ,,	H. J. Stevens - -					8	15	0
,, ,,	C. W. Heinemann -					5	0	0
,, ,,	Capt. H. Toynbee -	Salaries (discussion, &c. of observations and care of instruments).				33	6	8
,, ,,	Nav.-Lt. C. W. Baillie, R.N. - -					22	18	4
,, ,,	R. Strachan - -					27	15	6
,, ,,	C. Harding - -					22	18	4
,, ,,	H. Harries - -					14	11	8
,, ,,	W. Allingham -					14	11	8
,, ,,	W. G. James -					10	16	8
,, ,,	F. T. Bullen - -					9	3	4
,, ,,	R. F. Wallace -					8	6	8
			£	s.	d.			
,, ,,	G. J. Mayhew, rent - - -		158	15	0			
,, ,,	Pall Mall Coal Co., coals - -		5	5	0			
						164	0	0
,, ,,	General Life and Fire Insurance Co. -		1	6	0			
,, ,,	,, ,, ,, -		1	2	0			
						2	8	0
,, ,,	Williams and Norgate, books - -				-	6	10	5
,, ,,	J. S. Harding, senr., pension - -		-		-	10	14	1
,, ,,	W. Thomas, care of Scilly anemometer		1	13	1			
,, ,,	,, meteorological reports -		4	19	7			
						6	12	8
,, ,,	H. Williams, care of bridled anemometer - - -		3	12	11			
,, ,,	,, care of Robinson's anemometer - - - -		2	11	3			
						6	4	2
,, ,,	C. Niven, Aberdeen observatory - -		69	5	0			
,, ,,	J. L. E. Dreyer, Armagh observatory -		12	10	0			
,, ,,	W. L. Fox, Falmouth observatory -		61	19	6			
,, ,,	Fleetwood Improvement Commissioners, care of anemometer - - -		2	11	3			
,, ,,	R. Grant, Glasgow observatory - -		18	15	0			
,, ,,	Kew Committee, allowance for quarter -		100	0	0			
,, ,,	W. Harrison, care of North Shields anemometer - - - -		2	10	10			
,, ,,	W. I. Fortescue, care of Orkney anemometer - - - - -		2	10	0			
,, ,,	S. J. Perry, Stonyhurst observatory -		13	14	3			
,, ,,	J. E. Cullum, Valencia observatory -		41	16	10			
						325	12	8
,, ,,	G. T. Watson, care of Yarmouth anemometer - - -		4	12	6			
,, ,,	,, meteorological reports -		4	3	6			
						8	16	0
,, ,,	H. Todd, Cambridge - - -		4	11	0			
,, ,,	H. Mohn, Christiania - - -		5	10	0			
,, ,,	P. Curnow, Dungeness - - -		4	14	1			
,, ,,	W. Brand, Dunrossness - - -		3	18	5			
,, ,,	W. H. Bunce, Hawes Junction - -		1	19	3			
,, ,,	S. Richards, Holyhead - - -		3	18	2			
,, ,,	G. G. Appleton, Hurst Castle - -		3	18	4			
		Carried forward -	£28	9	3	2,508	2	10

		£	s.	d.	£	s.	d.
1887.	Brought forward -	28	9	3	2,508	2	10
March 31st.	J. Fisher, Jersey - - -	4	17	6			
,, ,,	F. Gaster, London - - -	3	18	0			
,, ,,	W. Berridge, Loughborough - -	3	5	6			
,, ,,	Secretary of Lloyd's, for Malin Head -	3	5	0			
,, ,,	K. Kerr, Mullaghmore - - -	5	5	1			
,, ,,	A. Penny, Nairn - - -	4	5	6			
,, ,,	W. Wickham, Oxford - - -	3	12	6			
,, ,,	B. Budds, Parsonstown - - -	3	7	6			
,, ,,	J. John, Prawle Point - - -	3	5	0			
,, ,,	S. Blake, St. Ann's Head - -	3	7	0			
,, ,,	J. B. Smith, Spurn Head - -	3	5	4			
,, ,,	Representatives of D. Macdonald, Stornoway - - - -	5	12	7			
,, ,,	J. Sinclair, Wick - - -	3	5	0			
,, ,,	F. Guy, York - - - -	3	18	0			
					82	18	9
,, ,,	Scottish Meteorological Society, Ben Nevis observations, 1886–7 - -	100	0	0			
,, ,,	Copies of observations at stations of Second Order - - - -	36	5	0			
					136	5	0
,, ,,	Postmaster-General, telegrams - -	-		-	169	10	11
,, ,,	A. Buchan, salary - - -	37	10	0			
,, ,,	W. C. Ley, ,, - - -	37	10	0			
					75	0	0
,, ,,	J. R. Jones, Aberdeen agent - -	4	4	0			
,, ,,	L. Allen, Dundee agent - - -	1	5	0			
,, ,,	J. Gill, Liverpool agent - - -	14	14	0			
,, ,,	Z. Scaping, Hull agent - - -	3	7	6			
					23	10	6
,, ,,	J. Wray, levelling at Colebrooke -	-		-	3	3	0
,, ,,	F. Gaster, for payment of allowances for late evening and Sunday attendance - -	-		-	16	0	1
,, ,,	J. S. Harding, jun., petty cash - -	-		-	40	0	0
					£3,054	11	1

116, *Victoria Street, April* 20, 1887.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (April 6) were read and confirmed.

The Draft Report of the Office for the year ending March 31, 1887, was submitted.

Reported—That Part II. of the Atlantic Weather Charts had been received from the Stationery Office.

Read—Letter 905 from Mr. Whipple, asking whether he was to continue his photographic observations on clouds (Minutes, 1886, p. 117).

Mr. Scott was instructed to authorise Mr. Whipple to procure 100 plates for photography. (P.C. 865.)

Submitted—The following Report (Minutes 1886, p. 27) :—

LIST of WARNINGS issued to the COASTS of the UNITED KINGDOM since the last Meeting of the Council, naming the Time of Issue, the Coasts warned, the Signal hoisted, and the Weather experienced while they were up, together with the Character of the Warning, whether successful or not.

Day and Hour of Issue.	Coasts warned.	Signals hoisted.	Gales experienced (if any) and approximate Time of their Occurrence.	Result.* Character of Warning.
1887.				
April 14th, 7.40 p.m.	Scotland, E. -	North cone	Neither gale nor strong wind† -	C
„ „	England, E. (north of Hull).	„		C
April 16th, 4.15 p.m.	Ireland, S. - -	South cone	No gale; no increase of strong wind‡ blowing at time of issue.	C
„ „	„ E. - -	„	„ „ „	C
„ „	Scotland, E. (northern part only).	„	Wly. winds, force 6 to 7, morning of 18th, S.W. 8 at Stornoway.	A
„ „	„ W. (with Isle of Man and Carlisle).	„	Neither gale nor strong wind‡ -	C
April 18th, 7.30 p.m.	Scotland, E. (northern part only).	South cone	Strong W.N.W. winds, preceded by moderate S.Wly. gale early on 19th.	B

* A = complete success, *i.e.*, justified by gales of force 8 or more (Beaufort's scale).
B = partial „ „ strong winds or moderate gales (force 6 and 7).
C = failure, not justified by either strong winds or gales.

† The depression proved to be shallow; had it not been for a faulty telegram from Christiansund, giving the wind there as S.S.W. instead of N.W., the warning would not have been issued. The signals were lowered early next morning.

‡ The warnings to Ireland and to Scotland W. were premature. When issued the wind was S.E.6 and apparently increasing considerably in the S.W. of Ireland, and the gradients for Southerly winds were growing steeper. The anticyclone (over the North Sea and England), however, subsequently increased in height, and moving Westwards., kept the advancing depression well out to sea, so that only our extreme Nn. coasts felt anything approaching to a gale. The signals were lowered as soon as possible next morning.

(Signed) FREDC. GASTER.

Telegraphic Branch,
20th April 1887.

Mr. Scott reported that the electric anemometer at Valencia was not yet in working order.—He was instructed to write to the General Post Office on the subject. (P.C. 867.)

Submitted—The following Statement respecting the Records for February 1885, receive from the Self-recording Observatories (see Minutes, 21st December 1868, 20th Novembe 1876, and 3rd January 1883):—

	Aberdeen.		Armagh.		Falmouth.§		Kew.		Valencia.	
ANEMOGRAPH:—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Action of Instrument	Good.	Good.	Good.	Good.*	—	—	Good.	Good.	Good.	Good.
Records deficient:—										
Due to stoppage of clock	0	0	0	0	—	—	0	0	0	0
„ other causes	0	0	0	35 hrs.†	—	—	0	0	0	0
Number of errors discovered:—										
By general examination	0	0	0	1	—	—	9	4	14‡	5
Results of 40 Remeasurements:—										
Greatest difference	1·0	1·0	1·0	2·0	—	—	1·0	1·0	0·0	1·0
Mean difference irrespective of sign	0·0	0·3	0·1	0·4	—	—	0·0	0·4	0·0	0·5
Residual difference (— Meteorological Office)	0·0	+0·1	0·0	+0·1	—	—	0·0	+0·1	0·0	±0·1
Orientation verified	27th	—	25th	—	—	—	3rd	—	2nd	—
RAIN GAUGE:—										
Action of Instrument	Indifft.		Good.		Good.		Good.		Good.	
Records deficient:—										
Due to stoppage of clock	0		0		0		0		0	
„ other causes	0		0		0		0		0	
Number of errors discovered:—										
By general examination	1		1		2		1		0	

	Aberdeen.	Falmouth.	Kew.	Valencia.
BAROGRAPH:—				
Action of Instrument	Good.	Good.	Bad.‖	Good.
Character of Photography	Do.	Do.	Excellent.	Do.
Records deficient:—				
Due to stoppage of clock	0	0	0	0
„ failure of light	0	0	0	0
„ other causes	0	0	1 hr.¶ 6 hrs.§ 1 hr.**	0
No. of errors discovered:—				
In entry of standards	0	1	0	0
„ calculating residuals	0	0	1	0
„ applying „	0	0	0	24††
By general examination	0	0	9	0
Results of 40 Remeasurements:—				
Greatest difference	·009	·010	·007	·009
Mean difference irrespective of sign	·004	·003	·002	·004
Residual difference (— Meteorological Office)	·000	+·001	—·001	·000
Mean monthly difference between simultaneous Barograph and Standard Barometer readings	·002	·002	·003	·002

	Aberdeen.		Falmouth.		Kew.		Valencia.	
THERMOGRAPH:—								
Action of Instrument	Good.		Good.		Good.		Good.	
Character of Photography	Do.		Do.		Do.		Do.	
Records deficient:—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Due to stoppage of clock	0	0	0	0	3 hrs.	3 hrs.	0	0
„ failure of light	0	0	0	0	0	0	0‡‡	0‡‡
„ imperfectly moistened bulbs	—	0	—	0	—	0	—	0
„ partially frozen bulbs	—	30 hrs.	—	0	—	14 hrs.	—	0
„ other causes	0	0	0	0	0	0	0	0
Number of errors discovered:—								
In entry of standards	0	2	0	2	0	0	0	2
In maxima and minima	0	—	0	—	1	—	3	—
By general examination	0	0	1	0	2	3	2	1
Results of 40 Remeasurements:—								
Greatest difference	0·2	0·2	0·3	0·3	0·2	0·2	0·2	0·3
Mean difference irrespective of sign	0·1	0·0	0·1	0·1	0·1	0·1	0·1	0·1
Residual difference (— Meteorological Office)	—0·1	0·0	+0·1	0·0	—0·1	—0·1	+0·1	+0·1
Mean monthly difference between simultaneous Thermograph and Standard Thermometer readings	0·1	0·2	0·1	0·2	0·1	0·2	0·1	0·1

* Intermittent in low velocities. † Frost.

‡ From 11 a.m. to 5 p.m. 19th, direction four points wrong. Errors repeated in "B" col. of subsidiary. § Instrument dismounted.

‖ Air hole reported to be choked with dust. ¶ Gas out for repairs. ** Tube slipping.

†† Values from 1 a.m. till midt. of the 1st, all one inch too high. ‡‡ Zero lines intermittent at times.

Read—A memorandum from Captain Toynbee reporting that since the last meeting 4 logs had been received, 2 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. R. F. Hoskyn, R.N. Lieut. F. Bowden Smith.	H.M.S. "Myrmidon."	Nov. 1, 1886—Feb. 28, 1887.	Surveying on Australian station.	1886, p. 111.
Capt. Pelham Aldrich, R.N. Sub.-Lieut. J. C. Tancred.	H.M.S. "Egeria."	Nov. 21, 1886—Feb. 27, 1887.	Plymouth and Colombo, viâ Suez.	1885, p. 96.

Mr. Scott was instructed to present the Charts (O. 43) to Mr. Tancred, and to convey the best thanks of the Council to the other observers.

116, *Victoria Street, May 4*, 1887.

PRESENT:

PROFESSOR STOKES IN THE CHAIR.

PROFESSOR DARWIN.	MR. STONE.
MR. GALTON.	THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (April 20) were read and confirmed.

The Draft Report for the year 1886–7 was further considered.

Read—Letter 794 from Captain D. W. Barker offering to have observations taken along the West Coast of Africa, from Teneriffe to the River Congo, by the staff of the Spanish National and of the West African Cable Companies.

It was resolved, on the recommendation of the Hydrographer, that instruments be supplied for five stations, viz., Teneriffe, Bathurst, Grand Bassin, St. Thomas Island, and the River Gaboon.

LIST of STORM WARNINGS issued to the BRITISH and IRISH COASTS since the last Meeting of the Council, naming the Hour of Issue, the Coasts warned, the Signal hoisted, the Gales experienced (with the approximate time of their occurrence), and the Result, as to the Character of each Warning.

1. WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any) and Approximate Time of occurrence.	Result.* Character of Warning.
1887.				
April 21st, 10 a.m. -	Ireland, S. -	South cone	No gale or strong wind - -	C
" " -	" E. -	"	Strong S.Wly. winds, evening of 21st.	B
" " -	Scotland, E. (N. of Aberdeen).	"	Strong S.Ely. winds and moderate gales, p.m. of 21st.	B
" " -	" W.† -	"	No gale or strong wind reported -	C
" " -	England, N.W. (I. of Man and Carlisle).	"	Strong Sly. winds early on 23rd -	B
April 21st, 11.20 a.m.	Scotland, E.† (S. of Aberdeen).	"	No gale or strong wind reported -	C
April 24th, 7.30 p.m.	Ireland, S. -	"	No gale or strong wind - -	C
" "	" E. (Dublin)		Strong Wly. winds on morning of 26th.	B
" "	England, W. -	"	No gale or strong wind - -	C
" "	" S.W. -	"	Strong S.Wly. to Wly. winds on 26th.	B
" "	" S. -	"	S.Wly. winds, strong, to a strong gale, on 26th.	A
April 25th, 10.20 a.m.	Scotland, E. (Nn. part only).	"	Fresh Sly. gales, night of 25th -	A
April 25th, 7.20 p.m.	Scotland, W.‡ -	"	No gale or strong wind - -	C
" "	Ireland, E. (Belfast)	"	Strong Wly. winds on morning of 26th.	B
" "	England, N.W. -	"	Strong S.Wly. to Wly. winds on morning of 26th; moderate gale at Barrow.	B

* Definitions: A = complete success; B = partial success (strong winds or moderate gales); C = failure.

† The information at hand for checking warnings to these coasts is at present much too scanty for the results to be much relied on.

‡ In this case the centre of this disturbance passed a *little* too far south for this coast to be affected.

2. There have been no gales experienced without warning.

(Signed) FRED. GASTER.

Telegraphic Branch,
4th May 1887.

Submitted—The following Statement respecting the Records for March 1885, received from the Self-recording Observatories (see Minutes, 21st December 1868, and 20th November 1876, and 3rd January 1883) :—

	Aberdeen.		Armagh.		Falmouth.†		Kew.		Valencia.	
ANEMOGRAPH :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Action of Instrument	Good.	Good.	Good.	*Indifft.	—	—	Good.	Good.	Good.	Good.
Records deficient :—										
Due to stoppage of clock	0	0	25 hrs.	24 hrs.	—	—	0	0	0	0
„ other causes	0	0	0	0	—	—	0	0	0	0
Number of errors discovered :—										
By general examination	0	0	2	4	—	—	3	1	2	1
Results of 40 Remeasurements :—										
Greatest difference	1·0	1·0	0·0	1·0	—	—	1·0	2·0	1·0	2·0
Mean difference irrespective of sign	0·0	0·3	0·0	0·4	—	—	0·0	0·4	0·1	0·5
Residual difference (—Meteorological Office)	0·0	0·0	0·0	+0·1	—	—	0·0	+0·1	0·0	+0·1
Orientation verified	30th	—	31st	—	—	—	4th	—	6th	—
RAIN GAUGE :—										
Action of Instrument	Indifferent.		Good.		‡Indifferent		Good.		‡Indifferent.	
Records deficient :—										
Due to stoppage of clock	0		0		0		0		0	
„ other causes	0		0		0		0		0	
Number of errors discovered :—										
By general examination	0		1		0		4		0	

	Aberdeen.	Falmouth.	Kew.	Valencia.
BAROGRAPH :—				
Action of Instrument	Good.	Good.	§Bad.	Good.
Character of Photography	Do.	Fair.	Good.	Do.
Records deficient :—				
Due to stoppage of clock	0	0	0	0
„ failure of light	0	0	4 hrs.	0
„ other causes	0	0	0	0
Number of errors discovered :—				
In entry of standards	1	0	0	0
„ calculating residuals	0	2	0	0
„ applying „	0	1	0	0
By general examination	0	2	0	6
Results of 40 Remeasurements :—				
Greatest difference	·009	·008	·010	·011
Mean difference irrespective of sign	·003	·003	·003	·003
Residual difference (—Meteorological Office)	·000	+·001	·000	—·001
Mean monthly difference between simultaneous Barograph and Standard Barometer readings	·002	·002	§·008	·001

	Aberdeen.		Falmouth.		Kew.		Valencia.	
THERMOGRAPH :—								
Action of Instrument	Good.		Good.		Good.		Good.	
Character of Photography	Do.		Do.		‖Do.		Do.	
Records deficient :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Due to stoppage of clock	0	0	0	0	¶0	¶0	0	0
„ failure of light	0	0	0	0	0	0	0	0
„ imperfectly moistened bulbs	—	0	—	0	—	0	—	1 hr.
„ partially frozen bulbs	—	8½ hrs.	—	0	—	11 hrs.	—	0
„ other causes	0	0	0	0	**1 hr.	0	0	0
Number of errors discovered :—								
In entry of standards	0	0	0	0	0	0	0	0
„ maxima and minima	0	—	0	—	4	—	5	—
By general examination	0	1	2	1	5	0	2	6
Results of 40 Remeasurements :—								
Greatest difference	0·2	0·2	0·2	0·2	0·2	0·3	0·3	0·2
Mean difference irrespective of sign	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1
Residual difference (—Meteorological Office)	0·0	0·0	0·0	—0·1	—0·1	—0·1	0·0	0·0
Mean monthly difference between simultaneous Thermograph and Standard Thermometer readings	0·1	0·3	0·2	0·2	0·2	0·2	0·1	0·2

* Intermittent at low velocities. † Instrument dismounted. ‡ Trace very faint.
§ Air-hole choked with dust. ‖ Zero lines very unequal in breadth ; imperfect definition. ¶ Regulation of clock very indifferent.
** Interfered with.

Submitted—The following Reports on the forecasts for the month of April 1887.

The letters used have the following signification:—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

APRIL.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	28	40	34	76
,,	b	44	40	42	
,,	c	16	12	14	
,,	d	12	8	10	
Scotland, E.	a	48	76	62	80
,,	b	32	4	18	
,,	c	16	8	12	
,,	d	4	12	8	
England, N.E.	a	44	44	44	84
,,	b	40	40	40	
,,	c	12	8	10	
,,	d	4	8	6	
England, E.	a	44	48	46	80
,,	b	40	28	34	
,,	c	16	12	14	
,,	d	0	12	6	
Midland Cos.	a	44	56	50	82
,,	b	48	16	32	
,,	c	4	16	10	
,,	d	4	12	8	
England, S.	a	40	56	48	78
,,	b	36	24	30	
,,	c	24	12	18	
,,	d	0	8	4	
Scotland, W.	a	32	56	44	78
,,	b	44	24	34	
,,	c	20	12	16	
,,	d	4	8	6	
England, N.W.	a	44	64	54	80
,,	b	40	12	26	
,,	c	12	8	10	
,,	d	4	16	10	
England, S.W.	a	40	64	52	88
,,	b	44	28	36	
,,	c	8	4	6	
,,	d	8	4	6	
Ireland, N.	a	48	64	56	80
,,	b	28	20	24	
,,	c	20	8	14	
,,	d	4	8	6	
Ireland, S.	a	48	72	60	94
,,	b	48	20	34	
,,	c	0	4	2	
,,	d	4	4	4	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	40	47	44	84
,,	b	40	40	40	
,,	c	13	7	10	
,,	d	7	6	6	
Scotland, E.	a	47	57	52	86
,,	b	37	30	34	
,,	c	13	3	8	
,,	d	3	10	6	
England, N.E.	a	60	60	60	89
,,	b	27	30	29	
,,	c	10	3	6	
,,	d	3	7	5	
England, E.	a	47	60	54	84
,,	b	30	30	30	
,,	c	20	10	15	
,,	d	3	0	1	
Midland Cos.	a	50	67	59	92
,,	b	40	27	33	
,,	c	10	3	7	
,,	d	0	3	1	
England, S.	a	47	63	55	84
,,	b	30	27	29	
,,	c	20	10	15	
,,	d	3	0	1	
Scotland, W.	a	30	57	44	79
,,	b	47	23	35	
,,	c	17	7	12	
,,	d	6	13	9	
England, N.W.	a	27	70	49	85
,,	b	50	23	36	
,,	c	17	0	9	
,,	d	6	7	6	
England, S.W.	a	47	67	57	92
,,	b	43	27	35	
,,	c	3	0	2	
,,	d	7	6	6	
Ireland, N.	a	33	63	48	84
,,	b	44	27	36	
,,	c	13	0	6	
,,	d	10	10	10	
Ireland, S.	a	43	70	57	87
,,	b	37	23	30	
,,	c	13	0	6	
,,	d	7	7	7	

SUMMARY.

British Isles	a	42	58	50	82
,,	b	40	23	32	
,,	c	14	10	12	
,,	d	4	9	6	
British Isles	a	43	62	53	86
,,	b	39	28	33	
,,	c	13	4	9	
,,	d	5	6	5	

Submitted—The following statement of accounts for the year ending 31st March 1887:—

Income.	£ s. d.	£ s. d.	Expenditure.	£ s. d.	£ s. d.
Balance from year 1885–86	- - -	1,555 7 11	Administration:		
Vote for year - -	- - -	15,300 0 0	Payment of Council -	1,000 0 0	
Repayment of expenses charged under—			Secretary - -	800 0 0	
(1.) Incidental expenses -	19 7 5		Salaries and wages -	792 12 0	
(2.) Special researches	25 17 6		Rent, fuel, and lighting	721 6 1	
(3.) Observatories -	3 19 11		Furniture and fittings	232 15 1	
		49 4 10	Incidental and contingent expenses -	407 5 1	
Supply of Weather Information:			Expenses incidental to International Meteorological Congress -	11 0 0	
D.W. Charts and Forecasts - - -	237 8 6		Pensions - -	42 16 4	
6 p.m. Charts - -	25 0 0				4,007 14 7
Information for Press Agencies, &c. - -	86 8 4		Special Researches*	- - -	520 9 9
Telegrams - -	342 13 2		Land Meteorology:		
Miscellaneous data -	12 1 6		Observatories and stations - -	1,920 13 11	
		703 11 6	Discussion and reduction of observations -	1,291 1 4	
					3,211 15 3
Sale of Instruments, &c.:			Weather Information and Forecasts:		
Royal Navy account -	2 0 0		Telegraphic reports and storm warnings	2,744 18 2	
Mercantile Marine account - -	43 9 5		Preparation and issue of reports and forecasts - -	1,639 19 9	
		45 9 5			4,384 17 11
Commission charged on work done for Colonies, &c. - -	- - -	23 13 8	Inspections:		
			Salaries and travelling	- - -	559 16 9
			Ocean Meteorology:		
			Discussion and reduction of observations -	1,858 11 0	
			Expenses incidental to the supply of instruments:		
			Proportion for care and issue of instruments -	200 0 0	
			Royal Navy -	531 4 6	
			Mercantile Marine	362 3 3	
			Distant island and coast stations -	17 18 9	
					2,969 17 6
			Balance - -	- - -	2,022 15 7
		£17,677 7 4			£17,677 7 4

Liabilities.	£ s. d.	Assets.	£ s. d.
To contracts or work uncompleted -	231 18 7	By cash at Bank - - -	2,249 8 10
„ Post Office (partly estimated) -	105 0 0	„ „ at Office - - -	82 19 11
„ sundry creditors - - -	235 18 0	„ „ at Valencia - - -	50 0 0
„ balance - - - -	2,022 15 7	„ sundry debtors - - -	213 3 5
	£2,595 12 2		£2,595 12 2

* Some expenses connected with electrical anemometer not yet brought to account.

Read—A memorandum from Captain Toynbee reporting that since the last meeting eight logs had been received, all of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. S. Dark -	"Blairgowrie" -	May 14, 1886—April 22, 1887.	To Port Darwin, Sourabaja, Banjewangie, and home.	—
Capt. R. Draper -	S.S. "Monarch"	Nov. 12, 1886—March 8, 1887.	Cable laying around British Isles.	1886, p. 88.
Capt. W. Hird -	"Marlborough"	Aug. 2, 1886—April 20, 1887.	To New Zealand and home.	1886, p. 3.
Capt. W. N. Lailey -	S.S. "Boyne" -	July 16, 1886—Feb. 8, 1887.	To Alexandria, Odessa, and home (two voyages).	1886, p. 48.
Capt. A. McLean -	S.S. "Concordia"	Sept. 26, 1886—April 19, 1887.	To and from Montreal (two voyages). To and from Baltimore (two voyages).	1886, p. 106.
Capt. E. J. Molony	"British Merchant."	May 7, 1886—March 23, 1887.	To San Francisco and home.	1886, p. 3.
Capt. H. Parsell -	S.S. "Adriatic"	Nov. 4, 1886—March 10, 1887.	To and from New York	1886, p. 96.
Capt. R. Peebles -	Bque. "Tweedsdale."	Feb. 17, 1886—April 24, 1887.	To Sydney, San Francisco, and home.	1885, p. 92.

Mr. Scott was instructed to present the Charts (O. 27) to Captain Dark and to convey the best thanks of the Council to the other observers.

Submitted—The following statements of work during April 1887:—

MARINE ROOM.

May 3, 1887.

Examined 13 new logs and 2 lighthouse registers.

North Atlantic Weather Charts.

Charts prepared and forwarded to the lithographer to April 30, 1883, and proofs of lithographed sheets received to March 19.

Finding lowest barometer readings near centres of disturbances for July.

The reduction of July charts commenced. Colouring, and measuring extent of, areas under various ranges of barometric pressure.

Preparing sets of charts for exhibition at the Royal Society's Soirée.

General.

Discussion of Red Sea data,—Office and Admiralty logs.

Copying observations from a rough book into log 6723.

Indexing data in ocean 10-degree squares.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE,
Marine Superintendent.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

(To 30th April 1887.)

Monthly Weather Report:—

1886, *November*.—Printed and issued.

December.—Nearly ready for press.

1887, *January*, *February*, *March* } Tables, rough maps, &c. prepared.

Weekly Weather Report, 1887.—Weekly numbers all issued promptly to date. Appendix I. (Quarterly Summary, &c.) for first quarter in press. Preparation of Appendices II. and III. being pressed forward quickly.

Daily Weather Report.—Issued promptly to date, with corrections, additions, and monthly summary for March. Additions and alterations made to standing matter (explanatory of signals) on page 3 of the report.

Daily United States Telegrams.—Plotted to date. Some alterations in method of reporting noted.

Report on Storm Warnings issued since last meeting of Council prepared and submitted herewith.

Checking of Daily (3.30 p.m. and 8.30 p.m.) *Forecasts.*—Complete to date.

Checking of Storm Warnings issued in 1886.—About one half done.

During the earlier half of this month Mr. Brodie continued to be far from well, but as he is now better the work of the Room (and especially the preparation of the Monthly Weather Reports) is being proceeded with more quickly. Mr. Sargeant also has been ill for two days.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

May 1887.

Observatory Returns.—The daily and other means, and the hourly vapour tension values, &c. have been completed for October and November 1884; the Hourly Readings for the same two months copied and sent to printer, and proof of October revised and signed for press.

Quarterly Weather Report.—The "General Summary" for Part IV., 1878, completed, and progress made with "Monthly notes." Proofs of chart plates for that quarter have been revised, and the chart plates for Part II., 1879, are about three-quarters done.

Harmonic Analyser.—The pressure coefficients for the five years' curves already passed through the machine have been worked, and the "result sheets" filled up. The analysis of the barograms for Glasgow 1876 is now being proceeded with.

Miscellaneous.—The sunshine cards for Bunhill Row, January–March 1887, tabulated for Royal Meteorological Society.

(Signed) R. H. CURTIS.

R. H. Scott, Esq., F.R.S.

EXAMINATION BRANCH.

May 2, 1887.

Examinations.

February (1885).—Four *anemograms.*

March (1885).—Three *thermograms,* three *barograms,* and four *anemograms.*

Partial examination of the Valencia work for January–March 1887, for the Registrar General for Ireland.

Weekly examination (on receipt) of curves and documents from all stations.

Glasgow barograph measurements, *re* storm of December 8th, 1886.

Reports, &c.

Re the incorrect working at Valencia.

Re the rainfall at Valencia.

Re the rainfall at Falmouth.

Notes of Errors to Aberdeen, Armagh (anemograms), Falmouth, and Valencia, for February and March 1885, and reports thereon to Council.

Miscellaneous.

Revising the "*Code of Regulations*" for the work of the First Class Observatories, and the examination thereof.

(Signed) T. E. ALLEN.

Reported—That the following cheques had been drawn during the month of April:—

1887.		£	s.	d.
April 2nd.	J. S. Harding, jun., for payment of weekly salaries -	15	3	0
„ 6th.	J. A. Curtis, for payment of accounts for reduction of old observations - - - - - -	25	14	0
„ „	Scottish Meteorological Society, weekly reports - -	4	10	6
„ „	E. D. Anderson, translation - - - -	2	7	0
„ „	D. McGregor & Co., Glasgow agents - - -	12	10	0
„ „	J. Pattison, hygrometer glasses - - - -	2	12	0
„ „	H. Pimlott, care of Bermuda anemometer - -	7	4	0
„ 9th.	J. S. Harding, jun., for payment of weekly salaries -	15	11	6
„ 15th.	Deutsche Seewarte, telegrams - - - -	*17	3	8
„ 16th.	J. S. Harding, jun., for payment of weekly salaries -	15	11	6
„ 19th.	E. Mascart, Paris, telegrams - - - -	*4	2	6
	Carried forward - -	£122	9	8

* Paid by draft on foreign banker.

		£	s.	d.
1887.	Brought forward - - -	122	9	8
April 20th.	J. Jackson, violet copying ink - - - -	2	4	0
„ „	Pickford & Co., carriage of parcels - - -	1	18	1
„ „	Pall Mall Coal Company, coals - - - -	5	5	0
„ „	T. De La Rue & Co., sunshine cards - - -	4	3	0
„ „	Negretti & Zambra, instruments and repairs - -	70	1	8
„ 23rd.	J. S. Harding, jun., for payment of weekly salaries -	15	11	6
„ 30th.	„ „ -	15	11	6
„ „	R. H. Scott, Secretary - - - - -	66	13	4
„ „	J. S. Harding, jun. } Office salaries - - -	27	15	6
„ „	T. D. Bell - - }	15	16	8
„ „	J. Sheerman, salary (harmonic analysis) - -	10	16	8
„ „	J. E. Cullum, salary (Valencia Observatory) - -	18	15	0
„ „	R. H. Curtis - - - }	22	18	4
„ „	J. A. Curtis - - -	18	6	8
„ „	T. E. Allen - - -	16	13	4
„ „	C. H. Thompson - - } Salaries (discussion, &c. of observations).	12	10	0
„ „	S. Call - - -	11	13	4
„ „	R. G. Canham - -	7	10	0
„ „	A. H. Bell - - - }	7	10	0
„ „	F. Gaster - - - }	25	15	7
„ „	F. J. Brodie - - -	18	5	7
„ „	G. G. Francis - - -	17	16	3
„ „	A. J. Rigby - - -	17	6	10
„ „	R. Sargeant - - - } Salaries (preparation, &c. of Weather Reports).	12	3	9
„ „	A. R. Simpkins - -	10	6	3
„ „	H. J. Stevens - - -	9	3	4
„ „	C. W. Heinemann - - }	5	0	0
„ „	Capt. H. Toynbee - - }	33	6	8
„ „	Nav.-Lieut. C. W. Baillie, R.N.	22	18	4
„ „	R. Strachan - - -	27	15	6
„ „	C. Harding - - - Salaries (discussion,	22	18	4
„ „	H. Harries - - - } &c. of observations and care of instru-	15	0	0
„ „	W. Allingham - - ments).	15	0	0
„ „	W. G. James - - -	11	5	0
„ „	F. T. Bullen - - -	9	3	4
„ „	R. F. Wallace - - - }	8	15	0
„ „	Gas Light and Coke Company, gas - - -	11	5	6
„ „	Bank of England, sale of S.O. forms - - -	11	12	3
„ „	Wightman & Co., book-post wrappers, &c. - -	7	16	0
„ „	F. Dangerfield, plate for Q. W. Report - - -	3	10	0
„ „	Bank of England, Navy General account - -	3	10	0
„ „	M. E. Anderson, measurement of barometric areas, &c. -	2	16	8
„ „	C. Harding, for payment of accounts for extracting observations for Dr. Paulsen, Copenhagen - -	22	8	10
„ „	J. S. Harding, jun., petty cash - - - -	50	0	0
„ „	R. H. Curtis, sunshine tabulating scales - -	10	5	4
„ „	F. Gaster, for payment of allowances for late evening and Sunday attendance - - - - -	17	4	11
		£896	12	6

116, *Victoria Street, May* 18, 1887.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (May 4) were read and confirmed.

Read—A letter (dated May 12th) from the Solar Physics Committee, requesting that a reply be sent to their former communication. (Minutes, 1886, p. 125.)

The Secretary was instructed to send the following reply (P.C. 1212):—

IN reply to your letter of the 12th ultimo (No 9247), on the subject of actinometry, and the supposed relations between solar variability and the meteorology of the Earth, I am instructed to inform you that in the absence of any actinometer of established character, which could be brought into regular use at the Observatories of the Meteorological Office, the Council do not see how they could undertake any direct investigation of the character in question, nor is the climate of the British Isles one in which such observations could, in their opinion, be carried out with the best chances of success. At the same time, if any such instrument, the records from which could readily be obtained, is forthcoming, the Council might be able to introduce its use at their Observatories. The Council further are disposed to think that the general question raised by the Solar Physics Committee is one the elucidation of which is rather suited for the independent investigation of some individual, than for the action of a body such as the Meteorological Council, which has no available observing staff with the leisure and qualifications suited for such a purpose. It seems to the Council to be doubtful whether an inquiry into the connexion between solar variability and terrestrial meteorology could be so readily based on observations made in such a climate as that of these Islands, as on those made in the more equable climates of tropical countries; and they would suggest that on this account the co-operation of the Meteorological Department of the Government of India might be invited, more particularly as the subject has already received considerable attention from observers and investigators in India.

Read—A memorandum from Captain Toynbee reporting that since the last meeting 7 logs had been received, all of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last Mention on Minutes.
Capt. A. Becket -	"Amana" -	April 10, 1886—March 26, 1887.	London, Madeira, Honolulu, Portland (Oregon), and home.	1885, p. 120.
Capt. R. J. Blacklin	S.S. "Maryland"	March 26—May 4, 1887.	Swansea and Philadelphia	1880, p. 116.
Capt. Hugh Cameron	S.S. "Ardandhu"	Feb. 19—May 10, 1887.	Swansea, West Indies, Marseilles, Newport (Mon.).	—
Staff.Comr. E. Clapp, R.N. H. King Sturdee (Chief Officer).	Sch. "Richmond."	Dec. 9, 1886—March 18, 1887.	At the Bahamas -	1886, p. 111.
Capt. C. F. Cooke, F. R. Met. Soc.	"Melbourne" -	Sept. 1, 1886—May 5, 1887.	London to Melbourne and home.	1886, p. 39.
Capt. D. Fullarton -	"Timaru" -	Aug. 14, 1886—May 7, 1887.	London to New Zealand	1886, p. 3.
Capt. Philip Moignard.	Bq. "Astoria" -	April 19, 1886—May 12, 1887.	Glasgow, Melbourne, Portland (Oregon), and home.	1885, p. 47.

Mr. Scott was instructed to present the Charts (O. 32) to Captain Cameron; and to convey the best thanks of the Council to the other observers.

Reported—That the eidograph borrowed from the Metropolitan Board of Works (Minutes, 1885, p. 61) had been returned to that office on the 16th instant. (Letter 1083.)

Submitted—The following report:—

REPORT on the DAILY WEATHER MESSAGES received from the UNITED STATES (viâ Paris) during the three months January to March 1887.

THE following report on the telegrams received at the Meteorological Office daily from the United States (viâ Paris) is made in order to show how far the telegrams have been of service to the Meteorological Office as aids to the issue of forecasts of storm warnings. In order to do this those cases have been selected in which a well-formed depression was shown over the United States or the adjacent parts of the Atlantic, having a motion in a more or less easterly direction. These have been tabulated and compared with the depressions which reached the shores of north-western Europe from the Atlantic, and caused gales on some part of the coasts. The coasts on which gales occurred were noted in all cases in which they were partial.

Herewith is a copy of the table referred to, and to it have been added columns showing (1) the position in which the depressions were observed on the western side of the Atlantic; (2) the dates on which we received information of their existence—whether of an indefinite or uncertain kind, or of a definite or certain kind; and (3) as to the date on which I have reckoned that the system would be due in our neighbourhood supposing it to cross the Atlantic at all.

Some remarks are appended where deemed necessary, and finally a column has been added showing the character of the information when looked upon as an indication of the weather on our coasts, as follows:—

A = complete success; B = partial success; C = total failure.

From the last column we gather that, out of the 20 depressions reported on the western side of the Atlantic during the three months:—

5 were classed A, or completely successful as indications of weather in north-western Europe.
4 „ B, „ partially „ „ „ „ „
11 „ C, „ failures „ „ „ „ „

In addition to these there were seven depressions, causing gales, which reached our coasts, and which I fail to connect with any depression known to have occurred previously over the United States or the western Atlantic.

In some of the cases which have been classed A or B (*e.g.*, that shown at midnight of January 29th and at noon on February 1st), the telegrams which gave definite information as to the disturbance did not reach us until after the system had actually arrived. In others the gales which occurred were so partial and felt at ports lying so far to the north-westward that, as warnings to the coasts of the British Islands, they may be considered as of little value.

Referring now to the character of the telegrams, it may be said:—

(1.) That the system hitherto in use of showing the distribution of pressure over continental America has not answered, the information being much too scanty. It is proposed by M. Mascart, on the recommendation of Mr. Finley (U.S.), to substitute for this a new system of reporting (see letters M.O. 982, 1040), by which the form and (approximately) the intensity of the depressions observed over the United States and the times of their exodus to the Atlantic, will be better indicated. This, if successful, will be a very decided improvement, but is likely to involve a much larger expense unless it is accompanied by a considerable reduction in the quantity of information transmitted from ships. It should, however, be observed that, under present arrangements information from ships often arrives so late that it is of little value as a warning, while a large proportion of the depressions reported do not come from the American Continent at all, and it is a question whether these latter do not cross the Atlantic more frequently than those which come from off the land. If, therefore, the reporting of ships' observations could be accelerated, some improvement might result.

(2.) The number of observations obtained from ships has often been far greater in quiet weather than was necessary. This might with advantage be curtailed, as the object of these messages is to serve as warnings of storms which appear to be on their way towards us from the Western Atlantic.

(3.) The barometric readings reported are unsatisfactory, often being irreconcilable one with another. But how far this is due to errors in the telegraphy is not known.

(4.) The observations of ice and of derelict ships are probably very useful, and are being transmitted to Lloyd's immediately they come to hand.

I cannot help thinking that in the form hitherto adopted, these reports are of no practical value whatever for the purpose of forecasting, and unless much more money is available, I do not see how they are to be materially improved.

Under any circumstances, in the present state of our knowledge the aid derived from such trans-atlantic messages must be very slight, and at times the knowledge that a deep depression has left the United States has caused the premature issue of warnings to our coasts, and a consequent failure which would otherwise have been avoided.

Telegraphic Branch,
18th May 1886. (Signed) FREDC. GASTER.

TABLE showing what STORM SYSTEMS were observed over the UNITED STATES and WESTERN ATLANTIC during the three months January–March 1887, and how far the Telegrams containing Information as to their Existence might have been of Use, as aids to the Issue of Storm Warnings to the British and Irish Coasts.

Date of Observation. 1887.	Approximate Position of Centre of Depression.	Date when Report of Depression was received in London.		When estimated to be due off Coasts of N.Wn. Europe.	Depressions (causing Gales) which appeared on the Coasts of N.Wn. Europe.	Remarks.	Whether the Report was, or was not, received in time for use as Warning.
		Of an Uncertain character.	Of a Certain character.				
January.	Lat. N. Long. W.	January.	January.	January.			
2nd, Noon	42° 65°	6th	6th, 7th	7th	Did not arrive		No.
—	—	—	—	—	Rather deep depression, Hebrides. 11th; "V"-shaped subsidiary.		No warning.
7th, „	44 63	- - -	13th	11th to 12th	Rather deep off the Hebrides, but at great distance to N.Wd. 13th; Southerly gales in extreme W. only.		Yes.
10th & 11th, „	48 67	- - -	16th	15th	Depression in N.W. on 16th; Southerly gales in extreme N.W. and N.		Yes.
					Deep large depression in W. and N.W.; strong Southerly gales on 17th.		No warning.
					Depression in W. evening of 18th; S.S.E. to S.W. gales.		No warning.
18th, „	43 68	- - -	23rd	24th (moving fast).	Large and deep in W. on 24th—26th; Gales Westerly and Northerly.		No.
22nd, „	43 63 (small and doubtful).	- - -	25th	28th	Large system far away to the N.Wd. of our Islands on 27th and in N. on 28th. Southerly gales in W. and N.W. of our Islands.		No.
					A similar disturbance on 28th—29th		No warning.
25th, „	48 63 (Very large system and moving S.E.)	28th & 29th	30th	29th to 31st	Deep and large in N.W. on 31st. Southerly gales. Subsidiary in S.E. on Feb. 1st.	The motion of this system on other side of Atlantic makes it very doubtful whether it and the one which reached our shores are identical.	No.
29th, Midt.	45 83	30th	- -	February. ? 3rd (moving very fast.)	Large and deep, in N.W. on 2nd, moving very fast. Strong Southerly gales.	The "Certain" intelligence arrived nearly a week too late.	No.
30th, „	47 70	31st					
February.			February.				
1st, Noon	48 53	- - -	7th—8th				

Date of Observation. 1887.	Approximate Position of Centre of Depression.		Date when Report of Depression was received in London.		When estimated to be due off Coasts of N.Wn. Europe.	Depressions (causing Gales) which appeared on the Coasts of N.Wn. Europe.	Remarks.	Whether the Report was, or was not, received in time for use as Warning.
			Of an Uncertain character.	Of a Certain character.				
February.	Lat. N. °	Long. W. °	February.	February.				
3rd, Midt. -	46	65	4th	8th, 9th	? 10th (moving fast.)	Did not arrive - - - -	- - - - - -	No.
4th, Noon -								
7th, Noon -	43	60	10th	11th	12th	Did not arrive - - - -	- - - - - -	No.
8th, Midt. -	47	67	9th	11th—14th	14th	Did not arrive - - - -	- - - - - -	No.
10th, „ -	45	75	11th	15th & 16th	16th	Large, in extreme N.W. on 16th -	This disturbance was too far away for its intensity to be known. The "certain" information arrived too late to be of much use.	No.
11th, „ -	45	64				Moderate gales only, in extreme N.W. -		
14th, Noon -	43	55	- - -	20th	18th or 19th	Large, in N.W. on 20th, but *no gales* -	Information received too late, even if the gales had arrived.	No.
						Very large, in N.W. on 22nd and 24th, S.Wly. gales in W. and N.	- - - - - -	No warning.
						Large in far W. on 26th - -	- - - - - -	No warning.
23rd, „ -	40	58	- - -	28th	28th	Moderate, but deep, over N.W. of Norway on 28th. S.W. gale in far north.	Our coasts little affected by gale. Information rather too late.	No.
23rd, Midt. -	40	85	24th	- - -	March. 1st	Moderate, deep, in N. of Norway on March 2nd. Gales at Christiansund only. Our Islands not affected.	The telegram conveying "Certain" information arrived too late.	No.
24th, „ -	45	65	25th	- - -				
26th, Noon -	47	55	- - -	March. 3rd				
26th, Midt. -	47	65	27th	- - -	? 5th (See remarks).	Sn. portion of a large system reached the N. of Norway early on 6th. (No gales.)	The movement of this system over Maine and Labrador seemed to indicate that it might probably not reach our coasts at all.	No.
27th, „ -	52	62	28th	2nd & 3rd				

Date of Observation. 1887.	Aproximate Position of Centre of Depression.		Date when Report of Depression was received in London.		When estimated to be due off Coasts of N.Wn. Europe.	Depressions (causing Gales) which appeared on the Coasts of N.Wn. Europe).	Remarks.	Whether the Report was, or was not, received in time for use as Warning.
			Of an Uncertain character.	Of a Certain character.				
March.	Lat. N.	Long. W.	March.	March.	March.			
1st, Midt.	47°	88°	2nd	—	6th (Moving very fast.)	Did not arrive	Had the system reached us the "certain" information would have arrived too late.	No.
2nd, „	44	65	3rd	7th				
10th, „	42	65	11th	16th	Uncertain. Movements very peculiar and irregular.	Did not arrive		No.
11th, Noon								
12th, „	42	62						
13th, „	42	55						
—	—		—	—	—	Large depression; reached W. of Ireland 21st, and a "V"-shaped subsidiary next day. Deep secondary system on 23rd. Gales very generally.		No warning.
21st, Noon	43	53	25th	27th	Uncertain; moving very rapidly.	Moderate (increasing) in N. on 26th. Gales in north.	Information received much too late.	No.
21st, Midt.	36	75	22nd	—	28th	Did not arrive		No.
22nd, „			23rd	—				
23rd, Noon & Midt.	45	68	—	25th & 27th				
24th, Midt.	42	47	25th	30th	30th moving fast.	Small, but deep; off Nn. coasts on 30th, whence it moved S.Ewds.	The telegram conveying "Certain" information arrived too late.	No.

Mr. Scott was instructed to draw the attention of Professor Mascart to the discrepancies in the barometrical readings (P.C. 1086), with the hope of introducing improvements.

Submitted:—The following Statement respecting the Records for April 1885, received from the Self-recording Observatories (see Minutes, 21st December 1868, 20th November 1876, and 3rd January 1883):—

	Aberdeen.		Armagh.		Falmouth.		Kew.		Valencia.	
ANEMOGRAPH:—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Action of Instrument	Good.	Good.	Good.	Indifft.†	‡	‡	Good.	Good.	Good.	Good.
Records deficient:—										
Due to stoppage of clock	0	0	0	0	—	—	0	0	0	0
„ other causes	0	0	0	0	—	—	0	0	0	0
Number of errors discovered:—										
By general examination	0	0	2	2	—	—	10	3	0	3
Results of 40 Remeasurements:—										
Greatest difference	1·0	1·0	1·0	1·0	—	—	0·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·1	0·5	0·0	0·3	—	—	0·0	0·3	0·1	0·6
Residual difference (—Meteorological Office)	0·0	+0·2	0·0	−0·1	—	—	0·0	0·0	+0·1	+0·1
Orientation verified	15th	—	—	—	—	—	17th	—	8th	—
RAIN GAUGE:—										
Action of Instrument	Indifferent.		Good.		*Indifferent.		Indifferent.		*Indifferent.	
Records deficient:—										
Due to stoppage of clock	0		0		0		0		0	
„ other causes	0		0		0		0		0	
No. of errors discovered:—										
By general examination	0		0		3		1		2	

	Aberdeen.	Falmouth.	Kew.	Valencia.
BAROGRAPH:—				
Action of Instrument	Good.	Good.	§Bad.	Good.
Character of Photography	Do.	Fair.	Good.	Do.
Records deficient:—				
Due to stoppage of clock	0	0	0	0
„ failure of light	0	0	0	0
„ other causes	0	¶1 hr.	0	0
Number of errors discovered:—				
In entry of standards	1	0	4	0
„ calculating residuals	0	1	1	0
„ applying	2	0	0	0
By general examination	0	2	5	5
Results of 40 Remeasurements:—				
Greatest difference	·008	·008	·005	·007
Mean difference irrespective of sign	·003	·003	·002	·003
Residual difference (—Meteorological Office)	−·001	·000	·000	+·001
Mean monthly difference between simultaneous Barograph and Standard Barometer readings	·002	·002	·003	·001

	Aberdeen.		Falmouth.		Kew.		Valencia.	
THERMOGRAPH:—								
Action of Instrument	Good.		Good.		Good.		Good.	
Character of Photography	Do.		Do.		Do.		Do.	
Records deficient:—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Due to stoppage of clock	0	0	0	0	0	0	0	0
„ failure of light	0	0	0	0	0	0	0	0
„ imperfectly moistened bulbs	—	0	—	0	—	2 hrs.	—	0
„ partially frozen bulbs	—	0	—	0	—	0	—	0
„ other causes	0	0	0	0	0	0	0	0
Number of errors discovered:—								
In entry of standards	0	0	0	0	0	0	0	1
„ maxima and minima	0	—	0	—	3	—	1	—
By general examination	0	0	1	0	3	1	3	2
Results of 40 Remeasurements:—								
Greatest difference	0·2	0·2	0·2	0·3	0·2	0·3	0·3	0·2
Mean difference irrespective of sign	0·1	0·0	0·1	0·1	0·1	0·1	0·1	0·1
Residual difference (—Meteorological Office)	−0·1	0·0	0·0	−0·1	0·0	−0·1	+0·1	0·0
Mean monthly difference between simultaneous Thermograph and Standard Thermometer readings	0·2	0·2	0·1	0·2	0·2	0·2	0·1	0·1

• Trace very faint † Intermittent at low velocities. ‡ Instrument dismounted. ¶ Photographic imperfections.
§ Air-hole choked with dust.

Submitted—The following report :—

OCCASIONAL TELEGRAMS received from BEN NEVIS.

MEMORANDUM.

THE primary object which has been kept in view while checking the telegrams received from Ben Nevis during these 16 months has been to ascertain how far the telegrams, as at present sent, have been of service as aids to the issue of storm warnings from the Meteorological Office.

To make this clear a table (annexed) has been prepared, showing the time of receipt of all the messages which arrived from Ben Nevis between 1st January 1886 and 30th April 1887, together with a brief statement as to the atmospheric conditions prevailing at the time when the telegram arrived, and the steps taken with regard to the issue of warnings to our coasts.

The messages received consisted of observations of pressure, temperature, wind, and weather made on the summit at two distinct hours, supplemented occasionally by a word or two as to the general appearance, &c.

During this period we issued from the Meteorological Office 86 warnings to the Scotch coasts, but we received from Ben Nevis only 19 telegrams. Of these two arrived before we issued the warnings, and on those occasions the receipt of the telegrams in no way influenced us in determining to warn.

When the observations made on Ben Nevis shall have been thoroughly discussed, and inferences deduced from them by the Ben Nevis Committee, it is possible that a new system of telegrams may be arranged, which should be of practical value to the Meteorological Office; at present, however, no such discussion has been published, and in their existing form the telegrams have given us no assistance.

(Signed) FREDC. GASTER.

TELEGRAMS received at the METEOROLOGICAL OFFICE from BEN NEVIS between January 1st, 1886 and April 30th, 1887.

Date of receipt of Telegrams.	Condition of Atmosphere about Time of Receipt of Telegram.	Warnings issued by the Office on others information.	Whether the receipt of the Ben Nevis Telegram was before or after issue of Warnings.
1886.			
January 7th, 6.47 p.m.	Depression in far north -	S. cone had been re-hoisted in N. and N.W. for 8 hours.	After
„ 13th, 8.56 a.m.	Deep depression in far north and subsidiary.	N. cone had been re-hoisted in N. and N.W. for 24 hours.	„
„ 14th, 7.12 p.m.	New depression advancing from N.W.	N. cone was still up - - -	„
„ 16th, 5.14 p.m.	Depression approaching W. of Scotland.	N. cone hoisted northern coasts 7.15 p.m. (W. and S.W. had been warned in afternoon.)	Before
„ 29th, 9.5 a.m.	Deep depression in N.W. -	S. cone had been hoisted previous day	After
February 5th, 6.42 p.m.	Depression off Wn. coasts moving N.Ewd.	S. cone had been hoisted in morning -	„
March 26th, 6.50 p.m.	Large depression in N.W. -	No signals hoisted. No gale Scotland. Fresh S.S.W. gale on W. coasts *before* message arrived.	„
„ 27th, 8.40 a.m.	Subsidiary depression in N.W.	S. cone hoisted in W. and S. at 10 a.m., 27th. No gale in Scotland.	Before
„ 30th, 2.57 p.m.	Deep depression in N.W. -	S. cone had been hoisted for above 4 hours.	After
April 1st, 6.55 p.m.	Deep depression off W. coasts.	S. cone had been re-hoisted for many hours.	„
„ 7th, 2.56 p.m.	Deep depression off W. coasts.	S. cone had been hoisted since 10 a.m.	„
„ 8th, 8.44 a.m.	Yesterday's depression over Scotland, subsidiary Irish Sea.	S. cone still up - - -	„
May 17th, 6.40 p.m.	Depression in N.W. moving N.Ewd.	S. cone had been hoisted W. Scotland since 4 p.m. (In Ireland it had been up much longer.)	„
„ 18th, 8.48 a.m.	Yesterday's depression now over Scotland, having grown complex.	We had lowered cone again N. and N.W., and no gale came.	„
Sept. 9th, 0.45 p.m.	Depression in W. moving N.Ewd.	S. cone had been hoisted since 10 a.m.	„
October 9th, 6.48 p.m.	Depression in W. moving N.Ewd.	S. cone had been hoisted since 10 a.m.	„
Dec. 8th, 8.30 a.m.	Exceptionally deep depression in N.W.	S. cone had been hoisted in W. and N.W., 7.15 p.m., 7th, and on other coasts next morning.	„
„ 7.25 p.m.	Exceptionally deep depression in N.W.		
1887.			
January 11th, 8.45 a.m.	Deep depression in N. -	S. cone had been hoisted previous day	„

Submitted—The following report:—

MEMORANDUM.

Telegraphic Branch, May 18, 1887.

SINCE the last meeting of the Meteorological Council there have been no warnings issued to the coasts of the British Islands, and there have been no gales experienced.

(Signed) FREDC. GASTER.

R. H. Scott, Esq.

Reported—That the service of evening telegrams from Stockholm (Minutes, 1886, p. 26) had commenced on the 5th instant.

Reported—That arrangements were in progress for the issue of Hay Harvest Forecasts as in recent years.—Approved.

The proof of a new edition of the Fishery Barometer Manual, of which the last edition appeared in 1869, was submitted and passed, subject to revision by the Chairman.

Professor Darwin having suggested that Mr. Callendar might be disposed to undertake a study of the Atlantic charts, and that accordingly a set of the charts might be placed at his disposal, and that he be allowed to borrow books from the Library, the Council resolved that this request be granted, on the understanding that at some future time they will consider, on the receipt of a report from Mr. Callendar, the propriety of giving him a suitable honorarium in recognition of his work, and of making some further arrangements as to a complete discussion of the charts. The Council also will be prepared to give Mr. Callendar any reasonable assistance in clerical work that he may require.

116, *Victoria Street, June* 8, 1887.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (May 18) were read and confirmed.

The draft Report of the Office for the year 1886–7 (Minutes, p. 12) was reconsidered and approved, and the Secretary was instructed to forward it to the Royal Society. (P.C. 1269.)

Read—The following letter (Minutes, 1886, p. 90), Lr. 1886, 2658, 2721; 1887, 188, 265, 432, 474; P.C. 1886, 2637; 1887, 4, 272, 426, 867:—

(M.O. 1201.)

General Post Office, London, May 31, 1887.

SIR,

WITH reference to your recent inquiry (M.O. 474), I beg leave to inform you that the rental for two double wire circuits at Valentia will be 18*l.* per annum instead of 10*l.*, the charge already arranged for two single-wire circuits.

I shall be glad to be informed if you desire the double-wire circuits to be provided on these terms.

I am, &c.

(Signed) J. C. LAMB.

Robert H. Scott, Esq., F.R.S.,
Meteorological Office.

Read—Letter 1242 from the Royal Meteorological Society, inquiring if the Office would allow 25*l.*, as usual, towards the cost of their inspections.—Approved (P.C. 1210).

Submitted—The following :—

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the last Meeting of the Council, naming the Hour of Issue, the Coasts warned, the Signal hoisted, the Gales experienced (with the approximate time of their occurrence), and the Result, as to the Character of the Warning.

(1.) WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result. (Character of Signal.†)
1887.				
May 19th, 3.45 p.m. -	Ireland, S. -	South cone	S.W. to N.W. gales on night of 19th.	A
„ „ -	England, W. (Bristol Channel).	„	Wly. to N.Wly. gales on 20th -	A
„ „ -	„ S.W. -	„	„ „ „ -	A
„ „ -	„ S. (Channel Islands and up to Southampton).	„	Wly. gales on 20th - -	A
May 19th, 6.45 p.m. -	Ireland, E. -	South cone	N.Wly. gales night of 19th and on 20th.	A
„ „ -	Scotland, W. -	„	Moderate gales from N.W. on 20th*	B
„ „ -	England, N.W. -	„	Heavy N.Wly. gales on 20th -	A
„ „ -	„ W. (except Bristol Channel).	„	„ „ „ -	A
„ „ -	„ S. (east of Southampton).	„	Strong Wly. gales on 20th -	A
„ „ -	„ S.E. -	„	„ „ „ -	A
„ „ -	„ E. -	„	Moderate S.Wly. to Wly. gales on 20th.	A
May 20th, 9.40 a.m. -	Scotland, E. -	North cone	Fresh Nly. gales evening of 20th -	A
June 5th, 7.30 p.m. -	Ireland, S. -	South cone	Neither gales nor strong wind -	C
„ „ -	„ E. -	„	„ „ „ -	C

* Information available too scanty to give reliable results for this coast.
† A = complete success; B = partial success; C = failure.

(2.) There were no gales experienced without warning.

(Signed) FREDC. GASTER.

Telegraphic Department,
8th June 1887.

Submitted—The following memorandum :—

On the GALES for which WARNINGS were not issued in 1886.

January 13th, England, N.W. and W.—At 6 p.m. 12th there was a large depression in the far N., passing away to the eastward, and moderate to fresh Westerly breezes prevailed over the British Isles. In the night, however, a subsidiary disturbance was developed over the North Sea, causing North-westerly gales on the coasts named. I do not see how this was to be foreseen from the information available.

January 30th, England, S.—This gale was "strong" in the Solent only. It was caused by the "spreading out" of a large depression in the far N., and was increased by a small and very shallow subsidiary system which came up the Channel. Perhaps this latter deserved more attention than it received.

April 7th, Ireland, S.—The depression causing this gale advanced so rapidly, that it is remarkable that the signals did not fail on more of the coasts. At 6 p.m. 6th, the barometer was still rising, even at Valencia, and there was nothing but an unreliable "cirrus" observation at Valencia to show that any depression was approaching.

May 15th, Scotland.—North-westerly and Northerly gale, caused by the spreading westwards of an apparently unimportant depression which was moving northwards over the North Sea, and a simultaneous temporary rise of the barometer in the N.W. Only one station (Aberdeen) reported force 9, and even there the anemometer registered only 42 miles per hour.

June 15th, East of Scotland, northern part.—A moderate gale from W. was already blowing in this region at 8 a.m. 15th, and as the barometer had begun to rise, it was anticipated that the depression in the far N. was passing off and that no stronger wind would be experienced. In the end, however, this proved to be an error.

September 27th, England, S.—Very similar to that of January 30. Caused by the spreading southwards of a gale which had been duly warned for in the more northern regions. It was "strong" in the Solent only. Strong squally breezes had been anticipated and forecasted.

November 6th, England, N.W.—This gale was caused by the sudden deepening of a depression which had been formed over Ireland early on the 6th. There was no gale at 6 p.m. 5th, and by 8 a.m. next day it was too late to warn this coast. Our other coasts were warned in time.

December 8th, Scotland, E. (south of Moray Firth).—The depression which caused this gale was exceptionally deep; had it not been so this coast would not have suffered. Although the observations at 6 p.m. 7th showed no gale, all our other coasts were successfully warned.

December 12th, England, S.W., S., and S.E.—West-south-westerly gale caused by the development of a depression over the North Sea early on 12th. Of this there was no indication whatever at 6 p.m. on 11th.

Read—A memorandum from Captain Toynbee reporting that since the last meeting nine logs had been received, six of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. W. C. Crutchley, R.N.	S.S. "Kaikoura"	Jan. 16—May 15, 1887.	Wellington and home, viâ Capes.	1886, p. 106.
Capt. T. Leportier	S.S. "Mira"	March 8—May 27, 1887.	Calcutta and home	1886, p. 126.
Capt. J. F. L. P. Maclear, R.M. Lieut. W. O. Lyne, R.N.	H.M.S. "Flying Fish."	Nov. 13, 1886—March 16, 1887.	Surveying on Australian station, and passage to Colombo and Aden.	1886, p. 126.
Capt. W. G. North	S.S. "Tiger"	Feb. 6—June 1, 1887.	Trading between Hull and Hamburg.	1886, p. 125.
Capt. W. Scott	Bq. "Commewyne."	Nov. 2, 1886—May 11, 1887.	Glasgow to Paramaribo and home.	188 p. 65.
Capt. Wm. Waring	S.S. "Breconshire."	Dec. 31, 1886—June 1, 1887.	China, Japan, East Indies, and home.	188 p. 8.

Mr. Scott was instructed to convey the best thanks of the Council to the above observers.

Submitted—The following statements of work during May 1887:—

MARINE ROOM.

June 8, 1887.

Examined 15 new logs.

North Atlantic WeatherCharts.

Reduced charts prepared and forwarded to the lithographer to May 24, 1883 (completing Part III.), and proofs received of lithographed charts to April 6.

Obtaining lowest barometer in the Doldrums during July 1883.

Colouring, and measuring extent of, areas under various ranges of barometric pressure for February 1883.

Charts prepared for exhibition at the Royal Society's soirée.

General.

Discussion of Red Sea data.

Preparing out line charts for the discussion of the cyclone of May and June 1885 in the Gulf of Aden and Arabian Sea.

Completing, in monthly form, Meldrum's "Tracks of Cyclones in the Indian Ocean, from 1856 1886"

Indexing data in ocean 10-degree squares.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

C. W. B.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

Monthly Weather Report, 1886 :—
November.—Issued.
December.—In type and partially revised.

Monthly Weather Report, 1887 :—
January to April.—Tables, maps, &c. prepared.

Weekly Weather Report :—
Numbers all issued promptly.
Appendix I., for first quarter.—Issued.
Appendices II., III., and IV.—In progress, and well forward.

Daily Weather Report.—Issued regularly to date. Corrections and additions for April, with monthly summary.—Issued.

Daily Telegrams from United United States :—
All plotted to date.
Those for three months January to March 1887 have been discussed and reported on. (See Minutes, p. 20.)
Reports on Storm Warnings issued to British and Irish Coasts since last meeting of Council.—
—Prepared and handed in.
Checking of Daily (3.30 *p.m. and* 8.30 *p.m.*) *Forecasts*—Complete to date.
Checking of Storm Warnings Issued in 1886.—Completed and results handed in.
Report as to value of Ben Nevis Telegrams hitherto received. (Minutes, p. 134).—Completed and handed in.
New "Fishery Diagram" for Barometer Manual.—Prepared and handed in.
Report on Experiments made with Mr. Galton's Small (Trigger) Anemometer.—About one half done.
Inspectors Notes for four Scotch Stations, with new Tables, Instructions, &c. for Stornoway.—Prepared and forwarded.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

June 1, 1887.

Observatory Returns.—The daily and five-daily means, and the calculation of the hourly vapour tension values, for December 1884 completed. The copying of the "Hourly Readings" for part of November and the whole of December 1884 completed, and forwarded to printer. The preparation of the Annual Tables for 1884 has been begun. Proof of "Hourly Readings" for November revised and signed for press.
Quarterly Weather Report.—The whole of the letterpress and tables for Part IV., 1878, together with the plates, forwarded to the printers. Chart plates for Part II., 1879, completed and sent to printer. Proofs of letterpress tables for Part I., 1879, read, but not yet returned for revise.
Harmonic Analyser.—The analysis of the barograms for 1876 completed for Glasgow, Aberdeen, and Falmouth, and the coefficients worked out for the two first-named observatories.
Miscellaneous.—The usual routine work connected with sunshine records. A set of barograms prepared for Royal Society soirée. A memorandum, specially asked for, prepared.

(Signed) R. H. CURTIS.

R. H. Scott, Esq., F.R.S.

EXAMINATION BRANCH.

June 1, 1887.

Examinations.

April (1885).—Three *thermograms*, three *barograms*, and four *anemograms*.
May (1885).—One *thermogram*, and five *anemograms*.
Weekly examination (on receipt) of curves and documents from all stations.
Investigation of thermograph differences consequent upon the change of zero lines.

Reports.

Notes of errors to Aberdeen, Armagh (anemograms), Falmouth, and Valencia for April 1885 and report thereon to Council.
Memorandum re Aberdeen residual. Answer to M.O. 934 re attached thermometer of Falmouth standard barometer.
Memorandum re M.O. 1140 (Kew) and M.O. 1151 (Valencia).

Miscellaneous.

Consideration of objections and proposed amendments to "Code of Regulations."
Mr. Allen was absent on four and a half and Mr. Call on seven days during the month.

(Signed T. E. ALLEN.

Mr. Scott reported that the amount of the allowance to the reporter at Jersey had been reduced from 7*s.* 6*d.* to 6*s.* a week, as he had now moved nearer the telegraph station (Minutes, 17th March 1886, and Letter, M.O. 970, 1887). There would be, however, a small charge for porterage on Sundays.—Approved.

Submitted—The following report on the forecasts for May 1887 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

MAY.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	48	46	47	84
,,	b	28	46	37	
,,	c	16	8	12	
,,	d	8	0	4	
Scotland, E.	a	48	54	51	89
,,	b	48	27	38	
,,	c	0	12	6	
,,	d	4	7	5	
England, N.E.	a	73	58	66	85
,,	b	23	15	19	
,,	c	4	23	13	
,,	d	0	4	2	
England, E.	a	61	58	60	95
,,	b	35	35	35	
,,	c	4	0	2	
,,	d	0	7	3	
Midland Cos.	a	69	46	58	89
,,	b	16	46	31	
,,	c	8	4	6	
,,	d	7	4	5	
England, S.	a	65	35	50	83
,,	b	23	42	33	
,,	c	4	15	9	
,,	d	8	8	8	
Scotland, W.	a	73	46	60	81
,,	b	15	27	21	
,,	c	12	23	17	
,,	d	0	4	2	
England, N.W.	a	66	62	64	81
,,	b	15	19	17	
,,	c	15	12	14	
,,	d	4	7	5	
England, S.W.	a	58	77	68	83
,,	b	27	4	15	
,,	c	11	8	10	
,,	d	4	11	7	
Ireland, N.	a	50	62	56	87
,,	b	38	23	31	
,,	c	8	8	8	
,,	d	4	7	5	
Ireland, S.	a	42	73	58	85
,,	b	39	15	27	
,,	c	4	0	2	
,,	d	15	12	13	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	61	48	55	86
,,	b	23	39	31	
,,	c	10	10	10	
,,	d	6	3	4	
Scotland, E.	a	58	52	55	86
,,	b	39	22	31	
,,	c	3	13	8	
,,	d	0	13	6	
England, N.E.	a	74	48	61	84
,,	b	20	26	23	
,,	c	3	16	10	
,,	d	3	10	6	
England, E.	a	71	58	65	88
,,	b	23	23	23	
,,	c	0	6	3	
,,	d	6	13	9	
Midland Cos.	a	74	32	53	86
,,	b	20	45	33	
,,	c	0	10	5	
,,	d	6	13	9	
England, S.	a	74	32	53	79
,,	b	16	36	26	
,,	c	3	19	11	
,,	d	7	13	10	
Scotland, W.	a	68	48	58	86
,,	b	29	26	28	
,,	c	3	13	8	
,,	d	0	13	6	
England, N.W.	a	78	49	64	86
,,	b	16	29	22	
,,	c	6	6	6	
,,	d	0	16	8	
England, S.W.	a	65	65	65	91
,,	b	29	23	26	
,,	c	6	6	6	
,,	d	0	6	3	
Ireland, N.	a	61	58	60	87
,,	b	29	26	27	
,,	c	3	3	3	
,,	d	7	13	10	
Ireland, S.	a	65	52	59	81
,,	b	19	26	22	
,,	c	13	6	10	
,,	d	3	16	9	

SUMMARY.

British Isles	a	59	56	58	85
,,	b	28	27	27	
,,	c	8	11	10	
,,	d	5	6	5	
British Isles	a	68	49	59	85
,,	b	24	29	26	
,,	c	5	10	8	
,,	d	3	12	7	

Reported—That the following cheques had been drawn during the month of **May**:—

1887.			£	s.	d.
May 7th.	J. S. Harding, jun., for payment of weekly salaries		15	11	6
„ 12th.	E. Mascart, French telegrams*		4	3	3
„ 14th.	R. Jenkin, thermometer screen		2	0	0
„ „	Postmaster General, telegrams		112	11	3
„ „	J. S. Harding, jun., for payment of weekly salaries		15	11	6
„ „	G. Neumayer, synchronous charts*		37	11	6
„ „	Pall Mall Coal Co., coals		5	5	0
„ „	R. W. Munro, repair of electrical anemometer		25	19	5
„ „	Royal Meteorological Society, observations		25	0	0
„ „	J. J. Hicks, thermometer screens		25	8	4
„ 21st.	J. S. Harding, jun., for payment of weekly salaries		15	11	6
„ „	Pickford & Co., carriage of parcels		1	19	3
„ 28th.	J. S. Harding, jun., for payment of weekly salaries		15	11	6
„ „	R. H. Scott, Secretary		66	13	4
„ „	J. S. Harding, jun. } Office salaries		27	15	6
„ „	T. D. Bell } Office salaries		15	16	8
„ „	J. Sheerman, salary (harmonic analysis)		10	16	8
„ „	J. E. Cullum „ (Valencia Observatory)		18	15	0
„ „	R. H. Curtis } Salaries (discussion, &c. of observations)		22	18	4
„ „	J. A. Curtis } Salaries (discussion, &c. of observations)		18	6	8
„ „	T. E. Allen } Salaries (discussion, &c. of observations)		16	13	4
„ „	C. H. Thompson } Salaries (discussion, &c. of observations)		12	10	0
„ „	S. Call } Salaries (discussion, &c. of observations)		11	13	4
„ „	R. G. Canham } Salaries (discussion, &c. of observations)		7	10	0
„ „	A. H. Bell } Salaries (discussion, &c. of observations)		7	10	0
„ „	F. Gaster } Salaries (preparation, &c. of Weather Reports)		25	15	7
„ „	F. J. Brodie } Salaries (preparation, &c. of Weather Reports)		18	5	7
„ „	G. G. Francis } Salaries (preparation, &c. of Weather Reports)		17	16	3
„ „	A. J. Rigby } Salaries (preparation, &c. of Weather Reports)		17	6	10
„ „	R. Sargeant } Salaries (preparation, &c. of Weather Reports)		12	3	9
„ „	A. R. Simpkins } Salaries (preparation, &c. of Weather Reports)		10	6	3
„ „	H. J. Stevens } Salaries (preparation, &c. of Weather Reports)		9	3	4
„ „	C. W. Heinemann } Salaries (preparation, &c. of Weather Reports)		5	0	0
„ „	Capt. H. Toynbee } Salaries (discussion, &c. of observations and care of instruments)		33	6	8
„ „	Nav. Lieut. C. W. Baillie, R.N. } Salaries (discussion, &c. of observations and care of instruments)		22	18	4
„ „	R. Strachan } Salaries (discussion, &c. of observations and care of instruments)		27	15	6
„ „	C. Harding } Salaries (discussion, &c. of observations and care of instruments)		22	18	4
„ „	H. Harries } Salaries (discussion, &c. of observations and care of instruments)		15	0	0
„ „	W. Allingham } Salaries (discussion, &c. of observations and care of instruments)		15	0	0
„ „	W. G. James } Salaries (discussion, &c. of observations and care of instruments)		11	5	0
„ „	F. T. Bullen } Salaries (discussion, &c. of observations and care of instruments)		9	3	4
„ „	R. F. Wallace } Salaries (discussion, &c. of observations and care of instruments)		8	15	0
„ 31st.	J. S. Harding, jun., petty cash		50	0	0
„ „	J. H. Woodstock, packing cases		2	8	6
„ „	F. Gaster, for payment of late evening and Sunday attendances		17	19	2
„ „	M. E. Anderson, measurement of barometric areas, &c.		4	15	0
„ „	C. Harding, for payment of work done for Dr. Paulsen, Copenhagen		26	15	9
„ „	A. Buchan, travelling expenses		12	15	2
„ „	Postmaster General, telegrams		113	7	4
			£1,049	3	6

* Paid by draft on a foreign Banker.

116, *Victoria Street, June* 29, 1887.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN. | PROFESSOR STOKES.
MR. GALTON. | MR. STONE.
THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (June 8) were read and confirmed.

Submitted—The following correspondence (Minutes, p. 26) :—

(M.O. 1201.)

SIR, June 14, 1887.

IN reply to your letter P.W. 175422/86, of the 31st ultimo, I am desired by the Meteorological Council to observe that the proposed charge of 18*l.* per annum for the four wires to be supplied to the Valencia Observatory appears to be very high, considering that the charge for *two* wires, which necessarily included the supply of the posts, was only 10*l.*

The Council would remind you that they were at first told by the telegraph officers of the Post Office that the electrical anemometer could be worked with *two* wires, and when they resolved to make the experiment the fact that the charge for the wires would only amount to 10*l.* had its due influence in their decision.

The considerable addition which it is now proposed to make to this charge, places the matter in a very different position, and the Council submit that in all the circumstances of the case the Post Office should not charge this Office with more than the *actual* additional outlay that will be caused by the erection and maintenance of the two additional wires, and I am to request that the matter may be re-considered.

I am, &c.
(Signed) ROBERT H. SCOTT,
Secretary.

The Secretary,
General Post Office, E.C.

(M.O. 1335.)

General Post Office, London,
June 15, 1887.

SIR,

I BEG leave to acknowledge the receipt of your further letter of yesterday's date (No. 1201), and to inform you that the rental of 18*l.* for the proposed double-wire circuits at Valencia is calculated strictly in accordance with the tariff rates of this Department, applicable to all similar wires throughout the country, and I regret that no reduction can be made.

I am, &c.
(Signed) C. H. B. PATEY.

R. H. Scott, Esq., M.A., F.R.S.,
Meteorological Office.

Read—A memorandum from Mr. Baillie, reporting that since the last meeting 11 logs had been received, 8 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. A. N. Adamson	S.S. "Brindisi"	March 24—June 20, 1887.	India and home, viâ Suez.	1886, p. 126.
Capt. Alex. J. Crighton.	S.S. "Colina" -	Nov. 26, 1886—June 6, 1887.	Monte Video, Barbadoes, Baltimore and home, &c.	1886, p. 91.
Capt. J. L. P. Maclear. Lieut. W. O. Lyne	H.M.S. "Flying Fish."	Mar. 17—May 31, 1887.	Aden to Spithead -	1887, ~~June 9~~ *p. 28*
Capt. W. H. Milner	R.M.S. "Severn"	Feb. 25—June 6, 1887.	The West Indies and home.	—
Capt. James Ross -	S.S. "Ben Alder"	Oct. 26, 1886—June 2, 1887.	Japan, New York and home, viâ Suez.	—
Capt. W. H. Rosetter	Bq. "St. Kilda"	Sept. 11, 1886—April 11, 1887.	Jamaica and Calcutta -	1886, p. 65.
Capt. A. Simpson -	S.S. "Australasian."	Dec. 24, 1886—May 31, 1887.	Melbourne, Sydney, Mauritius, Bombay, and home.	1886, p. 91.
Capt P. S. Tomlin -	S.S. "Ballaarat"	Feb. 13—June 4, 1886.	Australia and home -	1883, p. 55.

Mr. Scott was instructed to present the Charts (O. 27) to Captain Milner and (O. 32) to Captain Ross, and to convey the best thanks of the Council to the other observers.

Mr. Scott reported that it had been discovered (Letters 1314, 1378, P. C. 1245, and 1315) that duplicates of the barograms and thermograms were not being taken at Falmouth at present, and he was instructed to request that the practice of taking them be at once resumed (P.C. 1332).

Reported—That the transmission of reports from Valencia to Washington (Minutes, 1886, p. 126) had been resumed on the 10th instant (Letter 1298).

116, *Victoria Street, July* 20, 1887.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	MR. STONE.
PROFESSOR STOKES.	THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (June 29) were read and confirmed.

Submitted—The following correspondence (Minutes, p. 32) :—

(P.C. 1394.)
(M.O. 1328 and 1335.)

SIR, Meteorological Office, July 6, 1887.

I HAVE laid your letters of the 14th and 15th ultimo (No. 175,422) before the Meteorological Council, and am instructed by them to request that the whole matter, including the entire correspondence with the Engineering Department of the Post Office, commencing with Mr. Preece's letter of January 16, 1884, be submitted to the Postmaster-General for his personal consideration.

It was on the assurance of the telegraph officers that two wires would suffice for connecting the anemometer with the Valencia Observatory, and that the whole expense necessary for making the contemplated experiment had been stated, that the Meteorological Council resolved to enter upon it, and though they have no complaint to make as to the ultimate necessity for providing four wires having arisen, they submit that, the objects in view being wholly for the public interest, the charge made should be limited to the actual additional outlay which the Post Office incurs in their behalf.

I am, &c.
(Signed) ROBERT H. SCOTT,
Secretary.

The Secretary, General Post Office.

(P.W. 175,422.)
(M.O. 1526.)

SIR, General Post Office, London, July 15, 1887.

WITH reference to your letter of the 6th instant (M.O. 1328 and 1335) and to former correspondence, I am directed by the Postmaster-General to acquaint you, for the information of the Meteorological Council, that he has given the matter his careful consideration.

As regards the necessity for the two additional wires, Mr. Raikes does not see that there was any failure on the part of this Department. It was believed that two wires would have been sufficient, and in ordinary circumstances this would have been the case. The electrical conditions, however, proved unfavourable, and, from no fault of the Post Office, two additional wires were found to be necessary.

The cost of maintaining the wires will be an annually recurring charge, and the Department has no option but to charge an annual rental.

Mr. Raikes would have had much pleasure in acceding to the wishes of the Meteorological Council if it had been in his power to do so, but he regrets that he is not in a position to alter the decision already communicated to you.

I am, &c.
(Signed) C. H. B. PATEY.

Robert H. Scott, Esq., M.A., F.R.S.,
Meteorological Office.

Mr. Scott was instructed to inform the Post Office that the Council would accede to the terms proposed, viz., a rental of 18*l.* per annum. (P.C. 1473.)

Submitted—The following additional report on the gales on the British coasts (Minutes, 1886, p. 96) :—

REPORT on the SEVERE PARTIAL GALES experienced on the COASTS of the BRITISH ISLANDS during the 15 years 1871 to 1885.

Meteorological Office, Telegraphic Branch,
July 20, 1887.

SIR

IN accordance with the instructions of Professor Stokes, I beg to submit herewith a report of an inquiry into the nature of the severe partial gales experienced on the coasts of the British Islands during the 15 years 1871 to 1885.

A minute examination into the circumstances under which each of these gales occurred seems to show that they may fairly be classified under one or other of the following headings :—

a. Gales which were more or less general in the neighbourhood of the district, but which were felt only locally in the district itself.
b. Gales which extended from adjacent coasts to the *borders* of the district in question.
c. Gales which were occasioned by depressions skirting our coasts and only affecting portions of the districts near which they passed.
d. Gales which were local only as regards *direction* of wind, storms from other quarters being felt on adjacent coasts.
e. Gales which were the effect simply of very small systems (or "swirls"), and were consequently felt only over limited portions of the districts visited.
f. Gales which were felt in a part of one district only.
g. Gales which, though reported, were in all probability due to error in judgment of the observer.

In the table herewith the results of this classification are given for each district, and also for the various quarters from which the gales were experienced.

The aggregate values for the whole of the districts are given at the foot of the table, and show:—

1. That in 46 per cent. of the cases the gales, although more or less general in the neighbourhood of the district, were felt only locally in the district itself. In many instances it is difficult to see why certain of the stations should have failed to record the gale. As regards the telegraphic reporting stations, however, there can be little doubt that the occurrence of a gale during the night time frequently escapes the notice of the observer.
2. It would appear that in a considerable number (21 per cent.) of instances the gales were due to the extension of storms from other coasts to a portion of the districts in question.
3. That in 11 per cent. of the cases the gales were due in all probability to over estimation of wind force.
4. That in some few instances (8 per cent.) the gales were occasioned by depressions skirting our coasts, and only affecting portions of the districts near which they passed.
5. That in 6 per cent. of the cases the gales were purely local, no other district being affected.
6. That in 6 per cent. of the cases the gales were the effect simply of local squalls. In cases where these squalls were felt in only one district the gale was of course classed under the previous heading.
7. That in the remaining instances (2 per cent.) the gale was local only as regards the *direction* of the wind, storms from other quarters being felt on adjacent coasts.

The delay which has occurred in the production of this report has been due partly to my prolonged indisposition during the early spring, and partly to the necessity which subsequently arose for the preparation of the annual return relating to the checking of storm warnings.

(Signed) FREDK. J. BRODIE.

Submitted to Meteorological Council,
FREDC. GASTER.

R. H. Scott, Esq., M.A., &c., &c.

TABLE showing the NUMBER and NATURE of the SEVERE PARTIAL GALES experienced on the COASTS of the BRITISH ISLANDS during the 15 years 1871 to 1885

Districts.	Quarter from which the Gale blew.	Total Number of Severe Partial Gales experienced.	Classification of Gale.							Remarks.
			Gales more or less general in the neighbourhood of the District, but felt only locally in the District itself.	Gales extending from adjacent Coasts to borders of Districts.	Gales caused by Depressions just skirting Districts.	Gales local only as regards *Direction* of Wind. Storms from other quarters felt on adjacent Coasts.	Gales the effect simply of local Squalls.	Gales purely local. No other Districts affected.	Gales probably the effect of over-estimation of Wind-Force.	
E. SCOTLAND	From between N. and E. by N.	3	1	1	0	0	0	0	1	The two instances given under the first heading are somewhat doubtful. In each case the gale was felt in the N.E. of England as well as in the northern part of E. Scotland, and it seems almost impossible that the southern part of the district should have escaped.
	„ E. and S. by E.	5	2	0	0	1	0	1	1	
	„ S. and W. by S.	9	3	2	3	0	0	0	1	
	„ W. and N. by W.	7	3	0	2	0	0	2	0	
	From all directions	24	9	3	5	1	0	3	3	
N.E. ENGLAND	From between N. and E. by N.	2	1	0	0	0	0	1	0	The gale inserted under the last heading is very doubtful. The only station on our E. coasts which was affected by the gale was Whitby.
	„ E. and S. by E.	2	2	0	0	0	0	0	0	
	„ S. and W. by S.	20	1	15	0	0	3	0	1	
	„ W. and N. by W.	8	0	6	0	0	1	0	1	
	From all directions	32	4	21	0	0	4	1	2	
E. ENGLAND	From between N. and E. by N.	2	2	0	0	0	0	0	0	
	„ E. and S. by E.	2	1	1	0	0	0	0	0	
	„ S. and W. by S.	1	0	1	0	0	0	0	0	
	„ W. and N. by W.	2	0	2	0	0	0	0	0	
	From all directions	7	3	4	0	0	0	0	0	
S. ENGLAND	From between N. and E. by N.	0	0	0	0	0	0	0	0	
	„ E. and S. by E.	0	0	0	0	0	0	0	0	
	„ S. and W. by S.	4	2	0	0	0	2	0	0	
	„ W. and N. by W.	4	3	0	0	0	1	0	0	
	From all directions	8	5	0	0	0	3	0	0	
N.W. SCOTLAND	From between N. and E. by N.	4	4	0	0	0	0	0	0	Many of the severe partial gales in this district were reported at Stornoway only. The observer at that stations had apparently a tendency to over-estimate the wind-force, but taking into account the exposed situation of the place it is impossible to say that severe local squalls do not occur there.
	„ E. and S. by E.	2	2	0	0	0	0	0	0	
	„ S. and W. by S.	20	6	0	10	0	3	0	1	
	„ W. and N. by W.	7	4	3	0	0	0	0	0	
	From all directions	33	16	3	10	0	3	0	1	

TABLE showing the NUMBER and NATURE of the SEVER PARTIAL GALES, &c.—*continued.*

DISTRICTS.	Quarter from which the Gale blew.	Total Number of Severe Partial Gales experienced.	Classification of Gale.							REMARKS.
			Gales more or less general in the neighbourhood of the District, but felt only locally in the District itself.	Gales extending from adjacent Coasts to borders of Districts.	Gales caused by Depressions just skirting Districts.	Gales local only as regards *Direction* of Wind. Storms from other quarters felt on adjacent Coasts.	Gales the effect simply of local Squalls.	Gales purely local. No other Districts affected.	Gales probably the effect of over-estimation of Wind-Force.	
N. IRELAND	From between N. and E. by N.	1	0	1	0	0	0	0	0	
	„ E. and S. by E.	3	1	2	0	0	0	0	0	
	„ S. and W. by S.	5	1	2	1	0	0	0	1	
	„ W. and N. by W.	6	5	1	0	0	0	0	0	
	From all directions	15	7	6	1	0	0	0	1	
IRISH SEA	From between N. and E. by N.	4	2	0	0	1	0	0	1	
	„ E. and S. by E.	9	5	1	0	0	0	0	3	
	„ S. and W. by S.	10	6	1	0	1	0	0	2	
	„ W. and N. by W.	10	6	1	0	0	0	1	2	
	From all directions	33	19	3	0	2	0	1	8	
S.W. ENGLAND	From between N. and E. by N.	3	1	0	0	0	1	0	1	
	„ E. and S. by E.	7	5	0	0	0	0	0	2	
	„ S. and W. by S.	4	2	0	0	0	0	0	2	
	„ W. and N. by W.	6	4	0	0	1	0	1	0	
	From all directions	20	12	0	0	1	1	1	5	
S.W. IRELAND	From between N. and E. by N.	2	1	0	0	0	0	1	0	
	„ E. and S. by E.	1	1	0	0	0	0	0	0	
	„ S. and W. by S.	9	8	0	0	0	0	0	1	
	„ W. and N. by W.	8	3	0	0	0	0	5	0	
	From all directions	20	13	0	0	0	0	6	1	
ALL DISTRICTS	From between N. and E. by N.	21	12	2	0	1	1	2	3	
	„ E. and S. by E.	31	19	4	0	1	0	1	6	
	„ S. and W. by S.	82	29	21	14	1	8	0	9	
	„ W. and N. by W.	58	28	13	2	1	2	9	3	
	From all directions	192	88	40	16	4	11	12	21	
	Per-centages	—	46	21	8	2	6	6	11	

NOTE.—The gales experienced in N.E. England on December 26th, 1881; in E. England on November 22nd, 1877; in N.W. Scotland on December 13th, 1883; in N. Ireland on October 12th, 1885; and in S.W. England on December 30th, 1876, should be erased from the original list. Further examination shows that in each case the gale was felt more generally and widely than at first appeared.

Submitted—The following report:—

SIR, Meteorological Office, June 30, 1887.

I HAVE the honour to report, for the information of the Council, on the work which has been done during the quarter ending 30th June 1887.

The charts of the ocean district adjacent to Cape Guardafui, referred to in my last report (Minutes, 1887-8, p. 1), have been extended 54 miles to the eastward, and all available information for this addition has been dealt with and plotted on the charts.

CURRENT CHARTS.

Outline Charts.—The remaining 31 charts to be used in plotting the currents for all oceans have been drawn, thus completing the series of 48 charts required for this work.

Arctic Ocean (extending from the 60th parallel of latitude northward and between 80° E. and 100° W. longitude).—The currents for this ocean, obtained from all logs and documents in the Office, are being plotted on charts for each month of the year. This work will be finished in about a week.

PRESSURE CHARTS.

These charts are still in the hands of the printer. One chart of the Pacific and the four small range charts have yet to be passed for press.

I have discharged the duties of Marine Superintendent since the 25th of May.

I am, &c.
(Signed) C. W. BAILLIE,
Nav.-Lieutenant, R.N.

The Secretary, Meteorological Council.

Read—A memorandum from Captain Toynbee reporting that since the last meeting 12 logs had been received, seven of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. John Ewan -	S.S. "Kenmore"	July 15, 1886—July 14, 1887.	Ports in the Mediterranean and Baltic, nine voyages.	—
Capt. James Gordon	S.S. "City of Agra."	April 9—July 2, 1887.	Calcutta and home, viâ Suez.	1886, p. 131.
Capt. Thos. Mesnard	"Sierra Miranda"	Oct 17, 1886—July 7, 1887.	Rangoon and home -	1886, p. 65.
Capt. J. W. Millican	Barque "Myrtle Holme."	Sept. 2, 1886—July 13, 1887.	Melbourne and home -	—
Comr. W. U. Moore, R.N. Lieut. A. Balfour, R.N.	H.M.S. "Rambler."	Jan. 1—April 30, 1887.	Surveying in China Seas	1886, p. 131.
Capt. C. J. Russell -	"Khyber" -	Aug. 31, 1886—July 9, 1887.	Calcutta and home -	1886, p. 65.
Capt. S. Trott -	S.S. "Minia" -	Jan. 26—June 28, 1887.	Halifax, Boston, and home.	1886, p. 88.

Mr. Scott was instructed to present the Charts (O. 27) to Captains Ewan and Millican, and to convey the best thanks of the Council to the other observers.

Read—A memorandum by Mr. Scott (Letter 1559) requesting the Council to reconsider their resolution that the grant of 30*l.* to Mr. Strachan for assistance in the preparation of Part IV. of the Arctic Contributions should be final (Minutes, 1883, p. 16), and that a grant be made to Mr. Strachan for a honorarium for Part IV. and for assistance in the preparation of Part V.

Resolved—That no further money grant could be made, but that Mr. Scott should give Mr. Strachan such needful help from the Office staff as could be spared.

Submitted—The following statements of work for July 1887:—

MARINE ROOM.

July 13, 1887.

Examined 18 new logs and 2 lighthouse registers.

North Atlantic Weather Charts.

Proofs of lithographed charts to April 30, 1883, received, and to March 10 passed for press.

Obtaining lowest barometer readings in disturbances during August 1883.

Measuring extent of areas under various ranges of barometric pressure for February.

The female clerks engaged on the reduction of charts for July and preparing them for lithography.

General.

Discussion of Red Sea data.

Preparing outline charts, obtaining barometer corrections, and other preliminary work for the discussion of observations in the Arabian Sea during part of May and June 1885—the Aden Cyclone.

Completing Meldrum's Indian Ocean Cyclone Tracks, 1856 to 1886, in monthly form.

Indexing data in ocean 10° squares.

The Marine Superintendent. (Signed) CHAS. HARDING.

Forwarded for the information of the Council.

(Signed) C. W. BAILLIE,
Assistant Marine Superintendent.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

Monthly Weather Report:—

1886, *December*.—Partially revised.

1887, *January*.—About half written.

„ *February*.
„ *March*.
„ *April*.
„ *May*.
} Tables and maps (in rough) prepared.

Weekly Weather Report, 1887:—

Weekly numbers all issued promptly to date.

Appendix I., Part 2 (April to June) well advanced.

Appendix IV., Table 1. (Mean Temperature of air in each district for each week of the year, during the eight years 1878–85.—Completed.

The other appendices are all being pushed steadily forward.

Daily Weather Report.—Issued promptly to date, with Correction Tables and Monthly Summaries to May.

Daily United States Telegrams.—Nearly all plotted.*

Checking Daily (3.30 p.m. and 8.30 p.m.) *Forecasts*.—Done to date.

Hay Harvest Forecasts, 1887.—Organized and system now in full operation.

Report on experiments made with Mr. Galton's "Trigger" Anemometer.—Completed and handed in.

Appendices to Annual Report, 1887.—Corrected and handed in.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

July 1, 1887.

Observatory Returns.—The Annual Tables for 1884 completed and sent to printer. Proof of Hourly Readings for December 1884, and of the Annual Tables and Appendix, revised and the complete part signed for press. The daily and other means for January 1885 are now being calculated.

Quarterly Weather Report.—Proof of Part IV., 1878, with the accompanying plates, revised and signed for press. Proofs of chart plates for Part II., 1879, revised, and progress made with the tables, &c. for the same part. Chart plates for Part III., 1879, more than half done.

Harmonic Analyser.—The analysis of the barograms completed to the end of 1876.

Miscellaneous.—A sheet from the "Bridled" Anemometer copied on a large scale for exhibition at the Royal Meteorological Society. Some time occupied with Rev. C. Ley on sunshine recorders.

(Signed) R. H. CURTIS.

R. H. Scott, Esq., F.R.S.

EXAMINATION BRANCH.

July 1, 1887.

Examinations.

May 1885:—Two *thermograms* and three *barograms*.

June 1885:—Three *thermograms*, three *barograms*, and four *anemograms*.

Partial examination of the Valencia work for April and May 1887, for the Registrar General of Ireland.

Weekly examination (on receipt) of curves and documents from all stations.

Reports, &c.

Memorandum on barograph residuals in answer to M.O. 1161.

Miscellaneous.

Preparing and copying notes for Annual Inspection of Stations.

Mr. Allen was absent on five days (vacation, &c.) during the month.

(Signed) T. E. ALLEN.

* During this month Mr. Brodie has taken a portion of his summer vacation. As the holiday time comes on it will be impossible, from want of force, to do more in this department than keep the current routine work up to date.

Submitted—The following statement of accounts for the quarter ending 30th June 1887:—

Income.	£ s. d.	£ s. d.	Expenditure.	£ s. d.	£ s. d.
Balance from year 1886–87	- - -	2,022 15 7	Administration:		
Proportion of vote for quarter - - -	- - -	3,825 0 0	Payment of Council -	250 0 0	
Repayment of expenses charged under—			Secretary - -	200 0 0	
(1.) Incidental expenses -	4 15 6		Salaries and wages -	200 6 0	
(2.) Special researches	7 19 4		Rent, fuel, and lighting	185 15 6	
		12 14 10	Furniture and fittings	13 12 0	
Supply of Weather Information:			Incidental and contingent expenses -	82 16 6	
D.W. Charts and Forecasts - - -	83 17 5		Pensions - -	10 14 1	
6 p.m. Charts - -	6 5 0				943 4 1
Information for Press Agencies, &c. - -	41 12 9		Special Researches	- - -	238 5 11
Telegrams - -	45 15 7		Land Meteorology:		
		177 10 9	Observatories and stations - -	439 7 9	
Sale of Instruments, &c.:			Discussion and reduction of observations -	323 3 0	
Mercantile Marine account - -	- - -	7 15 3			762 10 9
Commission charged on work done for Colonies, &c. - -	- - -	3 3 3	Weather Information and Forecasts:		
			Telegraphic reports and storm warnings	640 7 10	
			Preparation and issue of reports and forecasts - -	424 14 11	
					1,065 2 9
			Inspections:		
			Salaries and travelling	- - -	142 15 2
			Ocean Meteorology:		
			Discussion and reduction of observations -	474 6 6	
			Expenses incidental to the supply of instruments:		
			Proportion for care and issue of instruments -	50 0 0	
			Royal Navy -	68 13 4	
			Mercantile Marine	57 19 4	
			Distant island and coast stations -	10 0 0	
					660 19 2
			Balance - -	- - -	2,236 1 10
		£6,048 19 8			£6,048 19 8

Liabilities.	£ s. d.	Assets.	£ s. d.
To Council - - - -	250 0 0	By H.M. Exchequer - - -	325 0 0
„ contracts or work uncompleted -	98 7 11	„ cash at Bank - - -	2,291 10 1
„ Post Office (partly estimated) -	90 0 0	„ „ at Office - - -	86 0 5
„ sundry creditors - - -	412 8 11	„ „ at Valencia - - -	50 0 0
„ balance - - - -	2,236 1 10	„ sundry debtors - - -	334 8 2
	£3,086 18 8		£3,086 18 8

Submitted—The following Reports on the forecasts for June 1887.

The letters used have the following signification:—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

JUNE.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	77	65	71	90
,,	b	15	23	19	
,,	c	8	4	6	
,,	d	0	8	4	
Scotland, E.	a	77	54	66	89
,,	b	19	27	23	
,,	c	4	8	6	
,,	d	0	11	5	
England, N.E.	a	69	64	67	90
,,	b	23	24	23	
,,	c	4	0	2	
,,	d	4	12	8	
England, E.	a	65	77	71	91
,,	b	27	12	20	
,,	c	8	4	6	
,,	d	0	7	3	
Midland Cos.	a	77	68	73	90
,,	b	15	20	17	
,,	c	8	12	10	
,,	d	0	0	0	
England, S.	a	81	73	77	92
,,	b	15	15	15	
,,	c	4	8	6	
,,	d	0	4	2	
Scotland, W.	a	62	64	63	89
,,	b	27	24	26	
,,	c	7	4	5	
,,	d	4	8	6	
England, N.W.	a	69	68	69	90
,,	b	27	16	21	
,,	c	0	8	4	
,,	d	4	8	6	
England, S.W.	a	65	69	67	87
,,	b	31	8	20	
,,	c	4	8	6	
,,	d	0	15	7	
Ireland, N.	a	65	60	63	86
,,	b	27	20	23	
,,	c	4	4	4	
,,	d	4	16	10	
Ireland, S.	a	73	69	71	85
,,	b	12	15	14	
,,	c	15	8	11	
,,	d	0	8	4	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	63	57	60	92
,,	b	37	27	32	
,,	c	0	3	2	
,,	d	0	13	6	
Scotland, E.	a	63	63	63	88
,,	b	30	20	25	
,,	c	7	7	7	
,,	d	0	10	5	
England, N.E.	a	67	60	64	92
,,	b	27	30	28	
,,	c	3	3	3	
,,	d	3	7	5	
England, E.	a	60	70	65	88
,,	b	33	13	23	
,,	c	7	10	9	
,,	d	0	7	3	
Midland Cos.	a	67	70	69	92
,,	b	30	17	23	
,,	c	3	10	7	
,,	d	0	3	1	
England, S.	a	77	77	77	91
,,	b	17	10	14	
,,	c	6	7	6	
,,	d	0	6	3	
Scotland, W.	a	60	64	62	86
,,	b	27	20	24	
,,	c	10	3	6	
,,	d	3	13	8	
England, N.W.	a	70	53	62	85
,,	b	20	27	23	
,,	c	7	10	9	
,,	d	3	10	6	
England, S.W.	a	60	70	65	87
,,	b	30	14	22	
,,	c	3	3	3	
,,	d	7	13	10	
Ireland, N.	a	57	53	55	85
,,	b	30	30	30	
,,	c	7	7	7	
,,	d	6	10	8	
Ireland, S.	a	63	64	64	87
,,	b	23	23	23	
,,	c	7	3	5	
,,	d	7	10	8	

SUMMARY.

British Isles	a	71	67	69	89
,,	b	22	18	20	
,,	c	6	6	6	
,,	d	1	9	5	
British Isles	a	64	64	64	89
,,	b	28	21	25	
,,	c	5	6	5	
,,	d	3	9	6	

Read—Letter 1543 from Mr. Bolam, of the Navigation School, Leith, requesting that certain instruments should be supplied from the Office to replace some which had been lent to the school in 1861, and had been damaged in use. Mr. Scott was instructed to reply (P.C. 1472) that the Council could not replace instruments, but would present to the school such of their instruments as might still be there.

Mr. Scott reported that Mr. Whipple had had a recurrence of illness (pulmonary hæmorrhage), but that he hoped to be able to go round on inspection of the observatories after a visit to the seaside (Letter 1560).

He also asked permission to go to Heligoland to erect the instruments (Minutes, 1886, p. 65).—Authorised.

He also stated that he proposed to instruct Mr. R. H. Curtis, who was intending to spend his vacation in South Wales, to visit the two stations in Pembrokeshire.—Approved.

Reported—That the cash accounts for the six months ended the 31st March last had been audited by the Chairman and Professor Darwin, and had been sent to the Treasury for the Audit Office. The receipts for the six months, exclusive of a balance of 2,474*l.* 12*s.* 9*d.* on the 1st October 1886, amounted to 8,824*l.* 7*s.* 8*d.* The payments amounted to 8,916*l.* 11*s.* 8*d.*, leaving a balance of 2,382*l.* 8*s.* 9*d.* in hand and at the Bank on the 1st April 1887.

Reported—That the following cheques had been drawn during the month of June:—

1887.			£	*s.*	*d.*
June 4th.	J. S. Harding, jun., for payment of weekly salaries	-	15	11	6
„ 11th.	„ „	-	15	11	6
„ „	W. C. Ley travelling expenses - - -	-	30	0	0
„ 14th.	E. Mascart, Paris telegrams* - - -	-	31	16	2
„ 18th.	J. S. Harding, jun., for payment of weekly salaries	-	15	11	6
„ 20th.	F. D. Laughlin, observations in the Pacific* -	-	5	4	2
„ 25th.	Kew Committee commissions - - -	-	7	16	3
„ „	J. S. Harding, jun., for payment of weekly salaries	-	15	11	6
„ „	R. H. Scott, Secretary - - - -	-	66	13	4
„ „	J. S. Harding - } Office salaries - -	-	27	15	6
„ „	T. D. Bell - } Office salaries - -	-	15	16	8
„ „	J. Sheerman, salary (harmonic analysis) -	-	10	16	8
„ „	J. E. Cullum, salary (Valencia Observatory) -	-	18	15	0
„ „	R. H. Curtis - }		22	18	4
„ „	J. A. Curtis - - }		18	6	8
„ „	T. E. Allen - - }		16	13	4
„ „	C. H. Thompson - } Salaries (discussion, &c. of observations).		12	10	0
„ „	S. Call - - }		11	13	4
„ „	R. G. Canham - }		7	10	0
„ „	A. H. Bell - - }		7	10	0
„ „	F. Gaster - - }		25	15	7
„ „	F. J. Brodie - }		18	5	7
„ „	G. G. Francis - }		17	16	3
„ „	A. J. Rigby - } Salaries (preparation, &c. of		17	6	10
„ „	R. Sargeant - } weather reports).		12	3	9
„ „	A. R. Simpkins - }		10	6	3
„ „	H. J. Stevens - - }		9	3	4
„ „	C. W. Heinemann - }		5	0	0
„ „	Capt. H. Toynbee - }		33	6	8
„ „	Nav.-Lt. C. W. Baillie, R.N. - }		22	18	4
„ „	R. Strachan - - }		27	15	6
„ „	C. Harding - - } Salaries (discussion, &c. of observations and care of instruments).		22	18	4
„ „	H. Harries - - }		15	0	0
„ „	W. Allingham - }		15	0	0
„ „	W. G. James - }		11	5	0
„ „	F. T. Bullen - - }		9	3	4
„ „	R. F. Wallace - }		8	15	0
	Carried forward - -		£656	1	2

* Paid by draft on a foreign banker.

			£	s.	d.	£	s.	d.
1887.		Brought forward -	-		-	656	1	2
June 30th.		G. J. Mayhew, rent - - -	158	15	0			
„	„	Pall Mall Coal Co., coals - -	5	5	0			
						164	0	0
„	„	Williams and Norgate, books - -	-		-	2	1	3
„	„	J. S. Harding, senr., pension (Minutes, 1882, p. 43) -				10	14	1
„	„	T. De La Rue & Co., sunshine cards -	-		-	8	15	0
„	„	Postmaster General, fitting up electrical anemometer - - - -	57	18	10			
„	„	Postmaster General, connecting electrical anemometer and providing batteries -	10	12	7			
						68	11	5
„	„	H. Williams, care of bridled anemometer - - -	3	13	0			
„	„	„ care of Robinson's anemometer - - - -	2	11	3			
						6	4	3
„	30th.	C. Niven, Aberdeen observatory - -	69	6	3			
„	„	J. L. E. Dreyer, Armagh observatory -	12	10	0			
„	„	W. L. Fox, Falmouth observatory -	62	17	6			
„	„	Fleetwood Improvement Commissioners, care of anemometer - - -	2	10	0			
„	„	R. Grant, Glasgow observatory - -	18	9	3			
„	„	Kew Committee, allowance for quarter -	100	0	0			
„	„	W. Harrison, care of North Shields anemometer - - - -	3	0	10			
„	„	W. I. Fortescue, care of Orkney anemometer - - - - -	2	10	0			
„	„	S. J. Perry, Stonyhurst observatory -	14	0	0			
„	„	J. E. Cullum, Valencia observatory -	46	1	9			
„	„	J. O'Driscoll, rent at Valencia - -	25	0	6			
						356	6	1
„	„	G. T. Watson, care of Yarmouth anemometer - - -	4	13	3			
„	„	„ meteorological reports -	4	6	6			
						8	19	9
„	„	H. Todd, Cambridge - - -	4	11	0			
„	„	H. Mohn, Christiania - - -	5	10	0			
„	„	P. Curnow, Dungeness - - -	4	11	10			
„	„	W. Edmonds „ - - -	2	12	0			
„	„	W. Brand, Dunrossness - - -	3	18	5			
„	„	W. H. Bunce, Hawes Junction - -	1	19	3			
„	„	S. Richards, Holyhead - - -	3	18	3			
„	„	G. G. Appleton, Hurst Castle - -	3	18	9			
„	„	J. Fisher, Jersey - - -	4	2	0			
„	„	F. Gaster, London - - -	3	18	0			
„	„	W. Berridge, Loughborough - -	3	5	7			
„	„	Lloyd's, for Malin Head - - -	3	5	0			
„	„	K. Kerr, Mullaghmore - - -	5	4	11			
„	„	A. Penny, Nairn - - -	4	4	10			
„	„	W. Wickham, Oxford - - -	3	12	6			
„	„	B. Budds, Parsonstown - -	3	7	6			
„	„	W. Hewith, Prawle Point - -	3	5	0			
„	„	S. Blake, St. Ann's Head - -	3	7	0			
„	„	W. Thomas, Scilly - - -	6	11	8			
„	„	J. B. Smith, Spurn Head - -	3	6	4			
„	„	A. Macdonald, Stornoway - -	2	11	9			
„	„	J. Sinclair, Wick - - -	3	5	0			
„	„	F. Guy, York - - - -	3	18	0			
						88	4	7
		Carried forward - -				£1,369	17	7

		£	s.	d.	£	s.	d.
1887.	Brought forward -	-		-	1,369	17	7
June 30th.	Postmaster-General, telegrams - -	-		-	149	19	2
„ „	Royal Meteorological Society, contributions towards inspections - - - -	-		-	25	0	0
„ „	J. R. Jones, Aberdeen agent - -	1	5	6			
„ „	J. Fowler, Cardiff agent - - -	3	9	7			
„ „	L. Allen, Dundee agent - - -	5	4	0			
„ „	Z. Scaping, Hull agent - - -	3	12	6			
„ „	J. Gill, Liverpool agent - - -	23	9	3			
„ „	C. H. Permain, Southampton - -	1	12	9	38	13	7
„ „	Captain J. W. Sheldrake, repairing barometer No. 171 -				1	4	9
„ „	J. A. Curtis, for payment of accounts for discussion of old observations - - - -			-	27	2	6
„ „	P. Adie, repairing "A" barometers -	21	6	0			
„ „	„ B. T. „ &c. -	2	17	6			
					24	3	6
„ „	H. Bond, Office repairs - - -	-		-	12	15	6
„ „	Bank of England, Stationery Office account	-		-	2	6	8
„ „	C. Harding, for payment of accounts for copying observations for Dr. Paulsen, Copenhagen	-		-	25	12	1
„ „	F. Gaster, for payment of accounts for late evening and Sunday attendance - - -	-		-	15	19	7
„ „	J. S. Harding, jun., petty cash - -	-		-	40	0	0
					£1,732	14	11

116, *Victoria Street, October* 21, 1887.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	PROFESSOR STOKES.
MR. GALTON.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (July 20) were read and confirmed.

Mr. Scott reported that on July 30 he had, by the Chairman's directions, written the following letter (Minutes, p. 25) :—

(P.C. 1549.)

DEAR MR. BUCHAN, Meteorological Office, July 30, 1887.

As we have put in a memorandum as to the results of telegraphy from Ben Nevis, up to last Easter, in our report just drawn up, I am instructed by the Chairman to send a proof copy to you.

I am off to Heligoland Monday. If you have any question I could ask for you, write *at once* (c/o Governor). I only stay there a week.

Yours, &c.
(Signed) ROBERT H. SCOTT.

The following letters had been subsequently received :—

BEN NEVIS OBSERVATORY.

(M.O. 1703.) Scottish Meteorological Society,
122, George Street, Edinburgh,
August 8, 1887.

DEAR SIR,

I BEG to acknowledge receipt of your letter of July 30th with enclosed memorandum, in proof, sent by instructions from General Strachey, Chairman.

As it is not possible to have a meeting of the Directors at present, I have called on several of them who are still in town, and shown them this correspondence.

The finding of the memorandum is that the telegrams received from the Ben Nevis Observatory are absolutely useless to the Meteorological Office in issuing storm warnings.

This statement is so incomplete that we do not think that in preparing the memorandum for your report the instructions have been kept in view which were sent to Mr. Omond in accordance with your letter of December 3rd, 1883, a copy of which, so far as refers to this matter, is herewith sent. A copy of this letter was sent to Mr. Omond with instructions to carry out your wishes to the best of his ability.

Now in these instructions to Mr. Omond no special mention is made of storms or storm warnings, and certainly neither the Directors nor the staff at the observatory have ever supposed that it was expected by the Meteorological Office that a telegram was to be sent for every storm that had actually broken out or appeared to be threatened. This, however, is the assumption of the memorandum.

We therefore think that, in these circumstances, the finding of the memorandum will be misleading to those of the public who have little or no knowledge of meteorological matters, and of the nature of the information asked from Ben Nevis Observatory; and, as regards others, it may be considered as doubtful if the find that weather telegrams from Ben Nevis Observatory are useless will be endorsed by them.

As you are aware, the Directors offered the Meteorological Office, in their letter of 16th November 1883, daily weather telegrams from both Ben Nevis Observatory and the low-level station at Fort William. This offer, however, the Meteorological Council did not see their way to accept, chiefly on the ground of the expense; but asked for telegrams whenever any very striking change of conditions or a special phenomenon of great interest was recorded. This has been done by Mr. Omond, and, so far as the Directors are aware, no application has been made by the Meteorological Office for more frequent telegrams or for any other information.

The Directors, in view then of the limited nature of the information asked for, would have been surprised if any other result had been found than that stated in the memorandum.

Yours, &c.
(Signed) ALEXANDER BUCHAN,
Secretary.

R. H. Scott, Esq.,
Secretary, Meteorological Council.

Scottish Meteorological Society,
Albert Buildings, 6, Shandwick Place,
Edinburgh.

(M.O. 1703.)

EXTRACT from Letter dated 3rd December 1883.

WE do not at present wish for regular telegrams; the cost of three a day from Ben Nevis and Fort William would be about 120*l.* a year, and as we do not see how exactly to use them from day to day we wish to wait till at least your results have been published. However, we should wish Mr. Omond to use his own discretion, and telegraph to us whenever any very striking change of conditions or a special phenomenon of great interest is recorded. No regular rules can be laid down for such a service, we must only try it and see what we get out of it. He may be somewhat liberal in telegraphing at first at least.

Meteorological Office, 116 Victoria Street,
London, S.W.

(M.O. 1816.)

DEAR MR. SCOTT, Treasury, August 26, 1887.

THERE were several questions raised in the debate on the grant for Meteorology which Mr. Jackson thinks must be considered, and he would be glad if, at your leisure, you would let him have a memorandum. They were:—

(1.) Dr. Clark. As to the cost of administration. He thought it too high, and threatened to move a reduction.

(2.) Colonel Nolan asked whether the Post Office could not arrange for statements as to weather being exhibited at each telegraph office during hay and harvest.

(3.) As to Scotch meteorological representation. Whether anything could be done to add a Scotch member to the Meteorological Society.

(4.) Professor Bryce pleaded on behalf of the Ben Nevis Observatory for aid, direct or indirect.

You will find what was said on the various points reported in the "Times" debates, I think.

Yours, &c.
(Signed) J. A. KEMPE.

Read—The following letter:—

Signal Office, War Department, Washington City,
August 1, 1887.

On January 1, 1875, was inaugurated, through the earnest efforts of the representatives of various Governments at the Vienna Meteorological Congress, a series of simultaneous meteorological observations taken at noon, Greenwich mean time. The scheme of these observations was tentative, and, in the opinion of some, its success was doubtful. However, those who questioned the practicability of the work did not realize how greatly the men who planned and elaborated this work were interested in, and devoted to, the science of meteorology. The confidence of the conference in the abnegation and harmony of international observers has been fully justified by the steady increase in the number of stations reporting. This service has developed from a comparatively limited work to one of great magnitude, covering almost entirely the Northern, and a portion of the Southern Hemisphere.

In accordance with the promises held forth by the Chief of the United States Signal Corps, these observations were arranged, reduced, and published at the expense of the United States, in the form of daily bulletins and maps, which, in accordance with the original promises and in the interest of the science of meteorology, have been distributed as an international comity of exchange to co-operating Government bureaus, private observatories, and many co-operating voluntary observers throughout the world. As the appropriations of the Signal Corps were gradually reduced, it later became necessary to discontinue the daily bulletins and maps, with the intention of publishing the maps, only, on a larger scale than was at first done. Continued reductions in the amount allowed this Service for printing prevented the Chief Signal Officer from carrying out his wishes.

Upon assuming charge, the present Chief Signal Officer deems it advisable, owing to existing conditions, to formally discontinue this work, on the part of the United States, December 31, 1887; until which time he will send to the various observers the daily weather map of the United States for the hour of the international observations.

The Chief Signal Officer appreciates the cordial co-operation of other Governments, as well as of personal observers, and he would be unwilling to assume the responsibility of terminating this unparalleled and most valuable series of observations without asking in advance an opinion upon this subject from those chiefs and voluntary observers whose constant and hearty support has not only contributed to, but has assured the success of, this work. The lack of funds, however, leaves no other recourse.

It is to be hoped that the accumulated and published material of these international observations will prove sufficient, supplemented as it will be in the future by the regular observations of various civilized countries, for such original study and research as will enable meteorologists to discover the underlying laws which govern the movements of individual storms in particular, and of the atmosphere in general.

The publication of monthly summaries and charts will, however, be continued to include December 1887, in order that the data for ten consecutive years may be in such shape as to render it valuable for study and examination. It is the further intention of the Chief Signal Officer to

publish charts of the average monthly pressure and temperature for each month in the year, based on ten years' international observations. In this connection it is especially desirable that this office be advised as to the difference between the monthly mean temperature at noon, Greenwich mean time, and the true monthly mean temperature for each station. It is further requested that, in addition to the correction to reduce the noon observations, Greenwich time, to the true mean, this office also be furnished, before the close of the series of observations, with the monthly mean temperature of the respective stations, as determined from two or more daily observations for a series of years, and that the average monthly rainfall at each station, for the ten years in question, be sent, so that, if possible, rainfall maps may be prepared in connection with those for temperature and pressure.

As chief of the Service which has been charged, on the part of the various countries represented at the Vienna Meteorological Conference, with the arrangement and publication of these observations, the Chief Signal Officer takes this opportunity to thank, in the name of that conference, the directors of meteorological services and of private observatories who have contributed so freely of their time and labour to this undertaking, and also the voluntary observers throughout the world, whose zeal and labours have furnished valuable meteorological data from localities not covered by the meteorological services of the various civilized states.

The Chief Signal Officer appreciates the unvarying courtesy which has been extended to him in the performance of his part of the work, the promptness and fidelity with which the various observers have forwarded their reports, and also the patience and kindness with which they have viewed any failure on the part of this office either to put the international data in acceptable form or to carry out such promises as have been made.

I am, &c.
(Signed) A. W. GREELY,
Brigadier General, and Chief Signal Officer.

R. H. Scott, Esq., F.R.S.,
Secretary, Meteorological Council, London.

Submitted the following correspondence:—

(M.O. 1614.)
(No. 3213.)

Hydrographic Office, Bureau of Navigation,
Navy Department, Washington, D.C.,
July 18, 1887.

SIR,

I HAVE the honour to ask the co-operation of the Meteorological Council, in a matter which I hope will add considerably to the usefulness of the Pilot Chart of the North Atlantic issued by this office the last day of each month. On the chart for August, now in preparation, there will appear, as usual, the curves showing the probable limits of the trade winds; or, rather both limits of the N.E. trades and the northern limit of the S.E. trades. But in addition to this, I wish to plot these limits as accurately as the data received will allow, *as they were actually observed by vessels during June and July of this year.* The curves thus obtained will, it is thought, be of interest to navigators as indicating how the actual limits for the present season agree with the normal limits, thus furnishing, probably, a better guide for immediate use than the normal positions of the curves can be expected to be. I would therefore ask that, if such assistance can be rendered without inconvenience, you will kindly send a cablegram to this office on the 29th inst., stating both limits of the N.E. trades and the northern limits of the S.E. trades on the 20th, 30th, and 40th meridians west of Greenwich, as indicated by your latest reports. Our own reports will suffice for the western Atlantic, and if at any time such information should be deemed of value by your office, I should be very glad to reciprocate by sending you a cablegram each month giving limits on the 40th, 50th, and 60th meridians, as indicated by our own reports.

As time will not admit of correspondence in connection with the August Chart, I would respectfully suggest the following cipher for a reply by cable to be sent not later than July 29th.

If you cable to *Hydrographer, Navy Department* the word "ALPHA," I will understand you to say "Cannot now conveniently cable data asked for; will answer more fully by mail."

If you cable as follows:—"BETA, *a*....., *b*....., *c*....., *d*....., *e*....., *f*....., *g*....., *h*....., *i*....., (the blanks being filled out on the plan mentioned below), I will understand you to say "The average of our reports for July and the latter part of June indicate curves which cut the meridians as follows:

			To be filled in with figures giving N. latitude to nearest ½ degree, or else word "Uncertain."
20th meridan	-	N. limit N.E. trades	A.....
		S. „ „ „	B.....
		N. „ S.E. „	C.....
30th meridian	-	N. „ N.E. trades	D.....
		S. „ „ „	E.....
		N. „ S.E. „	F.....
40th meridian	-	N. „ N.E. trades	G.....
		S. „ „ „	H.....
		N. „ S.E. „	I.....

Such assistance on your part will be highly appreciated, and I shall be glad to co-operate with you in this or any similar matter which may come up. It will be understood, of course, that such cablegram is to be sent at my expense.

Yours, &c.
(Signed) G. L. DYER,
Lieutenant U.S. Navy,
for the Hydrographer.

Mr. Robert H. Scott,
Secretary of the Meteorological Office,
116, Victoria Street, London, S.W., England.

Mr. Scott reported that on July 28 he had telegraphed to Washington "Alpha Scott," and had subsequently sent the following reply:—

(1614.)

DEAR SIR, July 30, 1887.

IN answer to your letter of the 18th instant, I was obliged to reply by cable in the negative. I now write to explain our position.

I have conferred with our Chairman, and with the Hydrographer to our Admiralty. As regards the latter, he says for his own office that "perhaps two vessels a year come home that way (viâ the Atlantic)."

As regards our own Office, we have, up to date, only three logs giving information for June (none at present for July of this year), and one of these came in yesterday. The information contained in them is given in the small chart of which I enclose a tracing.

We hardly think that such meagre data would be worth telegraphing. We have no system of boarding incoming vessels to consult their logs, and, as you can see from our reports, we do not receive quite 200 logs a year from all parts, from captains observing specially for us.

We are most willing to help if we can; possibly we could arrange preliminaries before Christmas, and begin the service in time for your first chart for 1888, if we came to an agreement.

Yours, &c.
(Signed) ROBERT H. SCOTT,
Secretary.

Lieut. G. L. Dyer, U.S.N., Hydrographic Office, Washington.

Mr. Scott reported that in the course of last spring certain typhoon track charts for the South Indian Ocean prepared by Dr. Meldrum had been transferred to the Office by the Hydrographer. He (Mr. Scott) had subsequently with the concurrence of the Hydrographer and the Chairman, applied to the Meteorological Department at Calcutta, in the hope of adding to Dr. Meldrum's data some tracks of cyclones from the North Indian Ocean. He had recently received a reply from Calcutta stating that no information of the required character was obtainable (M.O. 2197).

Mr. Scott submitted the last letter he had received from Dr. Meldrum:—

(M.O. 2029.)

MY DEAR MR. SCOTT, The Observatory, Mauritius, August 27, 1887.

* * * My first letters on the subject of the cyclone tracks were written with the view of obtaining information as to whether or not we might expect assistance, and, if not, as to what the publication of 500 copies would cost.

The very liberal offer of the Meteorological Council, made in your letter of April 30th, to publish the tracks *eventually*, but *with* the gale-tracks for the Bay of Bengal, &c., is still under consideration.

The Meteorological Society of Mauritius would itself furnish the tracks of most, if not all, of the known cyclones of the Bay of Bengal since 1848, and also the tracks of numerous extra-tropical gales in the Southern Indian Ocean; and several of the members of the Council of the Society would prefer that the *whole* of the work should be done by itself, or that, in the meantime, its tracks of the tropical cyclones south of the Equator should be published alone.

What they wish is, that the Meteorological Council would publish eventually gale-tracks prepared by the Meteorological Society for the *whole* of the Indian Ocean since 1848, or publish at once the tracks of the tropical cyclones south of the Equator.

The Society is prepared to do the whole of the work, which would take some time, say 12 months, or to place the tracks of the cyclones south of the Equator, since 1848, at your disposal at once, with, if you should wish it, all the *data*. * * *

Yours, &c.
(Signed) C. MELDRUM.

Submitted—The following Report:—

SIR, Meteorological Office, October 3, 1887.

I HAVE the honour to report, for the information of the Council, on the work which has been done during the quarter ending 30th September 1887.

Current Charts.

Arctic Ocean. (Extending from the 60th parallel of Lat. northward, and between 80° E. and 100° W. Long.)—The plotting of the currents in this ocean, referred to in my last report (Minutes, p. 37), has been completed.

Indian Ocean.—The plotting of the currents from the office logs for the month of June has been completed and considerable progress made with the July chart.

Pressure Charts.

I am informed by Mr. Dangerfield that the whole of the charts will be printed and delivered to the Stationery Office in the course of a few days.

I discharged the duties of Marine Superintendent from the 1st to the 19th July, and was absent from the office for six weeks summer vacation.

I am, &c.
(Signed) C. W. BAILLIE,
Navigating Lieutenant R.N.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE.

Read—A memorandum from Captain Toynbee reporting that since the last meeting 46 logs had been received, 29 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. Pelham Aldrich, R.N. Sub.-Lieut. J. C. Tancred, R.N.	H.M.S. "Egeria"	Mar. 1—June 30, 1887.	Surveying East Coast of Ceylon.	1887, p. 11.
Capt. S. P. H. Atkinson.	"Earl of Aberdeen."	Sept. 11, 1886—Aug. 22, 1887.	Penarth, Colombo, Akyab, and home.	1886, p. 33.
Capt. Hugh Campbell.	"Bolan" -	Jan. 29—Sept. 22, 1887.	Liverpool, Calcutta, and home.	1879, p. 7.
Capt. James Clarke, R.N.R.	S.S. "Olbers" -	April 1—Sept. 23, 1887.	Liverpool, Rio Janeiro, New York (2 voyages). Liverpool, Rio Janeiro (1 voyage).	1887, p. 5.
Capt. D. S. Cromarty	Barque "Cassandra."	Sept. 19, 1886—Aug. 9, 1887.	Sharpness, New Zealand, and home.	—
Capt. L. C. Dart -	"Alcester" -	Oct. 29, 1886—Aug. 6, 1887.	Sharpness, Madras, Rangoon, and home.	1886, p. 64.
Comr. L. S. Dawson, R.N. Lieut. H. H. Douglas, R.N.	H.M.S. "Sylvia"	Mar. 1—June 30, 1887.	Surveying in Mediterranean.	1886, p. 64.
Capt. J. Ivor Dunbar.	S.S. "Arracan"	April 12—July 25, 1887.	Rangoon and home, viâ Suez.	1887, p. 5.
Capt. W. Ellery -	"Talookdar" -	Nov. 6, 1886—Aug. 6, 1887.	Liverpool, Calcutta, and home.	1886, p. 64.
Capt. T. England -	Barque "Jane"	June 22, 1886—Jan. 21, 1887.	Miramichi, home, Quebec, home, Matanzas.	1886, p. 64.
Capt. W. V. Graham	"Tenasserim" -	Feb. 13—Oct. 8, 1887.	Liverpool, Calcutta, and home.	1886, p. 81.
Capt. John Gray -	S.S. "Hope" -	Mar. 17—Aug. 25, 1887.	Greenland, whaling -	1886, p. 90.
Capt. William Hood	"County of Edinburgh."	Oct. 2, 1886—Oct. 13, 1887.	Penarth, Bombay, Calcutta, and Hull.	—
Comr. H. F. Hoskyn, R.N. Lieut. F. Bowden-Smith, R.N.	H.M.S. "Myrmidon."	Mar. 1—June 30, 1887.	Surveying Australian Station.	1887, p. 11.
Capt. P. J. Irving -	S.S. "Republic" and S.S. "Celtic."	Feb. 17—Aug. 25, 1887.	Liverpool to New York (6 voyages).	1886, p. 125.
Capt. A. H. Kemp -	Barque "Hudson."	Oct. 21, 1886—Sept. 24, 1887.	Glasgow, New Zealand, and home.	—
Capt. J. W. King -	"Philomene" -	Dec. 17, 1886—Sept. 16, 1887.	Cardiff, Rangoon, and home.	1886, p. 88.
Capt. W. N. Lailey	S.S. "Boyne" -	Feb. 15—July 30, 1887.	Cardiff and Rangoon (1½ voyages).	1887, p. 16.
Capt. T. Leportier -	S.S. "Mira" -	June 24—Sept. 8, 1887.	Liverpool, Calcutta, and home.	1887, p. 28.
Capt. F. Marshall -	"Berkshire" -	Sept. 12, 1886—July 11, 1887.	Liverpool, Rangoon, and home.	1886, p. 36.
Capt. John Mitchell	"Cape Verde" -	July 29, 1886—May 12, 1887.	Cardiff, Singapore, and home.	—
Capt. W. G. North	S.S. "Tiger" -	June 6—Oct. 1, 1887.	Hull and Hamburg -	1887, p. 28.
Capt. Moses Parry -	S.S. "Prydain"	Jan. 21—July 26, 1887.	Palermo, New York, Malta, and Boston.	1886, p. 131.

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. H. Parsell -	S.S. "Adriatic"	April 28—Oct. 6, 1887.	Liverpool, New York (6 voyages).	1887, p. 16.
Capt. W. Spratly -	S.S. "Mozart" -	Dec. 21, 1886—Aug. 7, 1887.	Buenos Ayres and Liverpool (2½ voyages).	1886, p. 111.
Capt. H. de la Cour Travers.	S.S. "Tartar" -	Feb. 11—Aug. 29, 1887.	Plymouth and Cape Town (3 voyages).	1885, p. 27.
Capt. H. Trunks -	Barque "Aldborough."	Nov. 11, 1886—Aug. 29, 1887.	Cardiff, Ceylon, Rangoon, and Antwerp.	1886, p. 81.
Capt. H. Walker -	S.S. "Cephalonia."	Jan. 19—Aug. 27, 1887.	Liverpool, Boston (6 voyages).	1886, p. 106.
Capt. N. J. Wheaton	Barque "Eliza"	Jan. 24—July 5, 1887.	Ayr to Demerara, Barbados, Guadaloupe, and Nantes	1886, p. 106.

Mr. Scott was instructed to present the Charts (O. 27) to Captain Cromarty, Kemp, and Mitchell, and (O. 43) to Captain Hood, and to convey the best thanks of the Council to other observers.

Submitted the following reports:—

REPORT of INSPECTION of the IRISH STATIONS, with HOLYHEAD.

TELEGRAPHIC REPORTING STATIONS.

Holyhead, visited August 11.—The instruments at this station were clean and in good order. As regards the sand-glass anemometer, I think that the reason that Captain Richards's estimates fall below those from Sumburgh Head and North Shields is to be found in the position of the Sailors' Home at Holyhead, on the slope of a small hill rising from the harbour. I have had a post for the reception of the instrument erected on Salt Island, close to the site of the bridled anemometer, and have directed Richards to make a series of comparative observations in the two sites.

Belmullet, visited August 30.—I found nothing calling for remark at this station. The observer is rapidly learning to observe and report clouds accurately.

Roche's Point, visited September 9.—This station was in good order, as usual. I have to report that Lord Fermoy, the landlord, has proposed that the Office should pay a rent of 1*l.* yearly for the enclosed plot of ground (12 feet square) on which the thermometer stand is placed, and I recommend that this be accepted.

Valencia, visited September 14.—As regards the telegraphic observations there is nothing to report.

Parsonstown, visited September 19.—The observer at this station has been changed, but in all other respects no remarks are necessary.

Donaghadee, visited September 27.—This station is in good condition, but I regret to say that the reporter is in a serious condition, from pulmonary affection. I fear it may be difficult to supply his place in case of death.

Malin Head, visited September 28. The circumstances at this station are not satisfactory. The observer, J. O'D. Farren, at times hands over the work to an imperfectly trained assistant, and the Office can never be sure who is observing. The observer raises a difficulty about the 6 p.m. reports, inasmuch as the tower at which the barometer, &c. are placed is on a rocky hill, the descent of which after dark in winter is not easy.

Mullaghmore, visited September 30.—This station is, as usual, in good order.

WEEKLY WEATHER REPORT STATIONS.

Currygrane, visited September 2.—I found this station in good order. I am trying to induce Mr. Wilson, who has the requisite instruments, to institute readings at 9 p.m., so as to raise the station to the Second Order.

Killarney, visited September 13.—There is nothing to remark about this station.

Foynes, visited September 16.—The position of the instruments has been slightly changed, and they are all in good order, but the observations are not kept up when Lord Monteagle is not at home.

Waterford, visited September 21.—This station continues fairly satisfactory.

Kilkenny, visited September 22.—There is nothing to remark about this station, except that the rain gauge requires alteration, as it is of faulty construction.

STATIONS OF THE SECOND ORDER.

Dublin (Fitzwilliam Square), visited August 25.—This station is, as usual, in as good condition as is possible in the locality.

Dublin (Glasnevin), visited August 26.—I have nothing to remark about this station. The rainfall has during the first seven months of this year been exceptionally small, only 6·77 inches.

Dublin (Mountjoy Observatory), visited August 26.—The instruments were in very good order, but the anemograph had not arrived at the date of my visit.

Markree, visited September 1.—This station also was in very good order. The mercury in the cistern of the Fortin's barometer is, however, much oxidised.

Parsonstown, visited September 19.—There is a change of observers at this station, and for the present Dr. Bœddicker is taking the observations. The regular observer has not yet been appointed.

Colebrooke, visited October 1.—This station does not call for remark.

Armagh Observatory, visited September 26.—The instruments are all in good condition, Dr. Dreyer has applied for a grass minimum and a solar radiation thermometer, which have been supplied.

(Signed) ROBERT H. SCOTT.

The following table shows the results of the thermometric comparisons:—

Corrections to be applied to the readings of—

STATIONS.	Dry Bulb.	Wet Bulb.	Max.	Min.	Spare Ther.	REMARKS.
STATIONS OF THE SECOND ORDER.						
Armagh	+0·1	0·0	−0·7	—	—	
Brookborough	−0·9	−0·9	−0·4	−0·1	—	
Dublin (City)	−0·3	−0·2	−0·6	−0·1	—	Grass min. +0·1.
Dublin (Phœnix Park O.S.O.).	−0·5	−0·4	−0·6	+0·1	—	Do. +0·1.
Glasnevin	−0·1	−0·2	−0·7	+1·4	−0·2	Do. −0·1.
Londonderry	−0·3	−0·3	+0·3	+0·5	−0·1	
Markree Castle	−0·1	+0·1	0·0	+0·1	—	
Parsonstown	−0·4	+0·1	−0·3	0·0	—	
TELEGRAPHIC REPORTING STATIONS.						
Holyhead	+0·2	+0·1	0·0	+0·7	0·0	
Malin Head	−0·3	−0·2	−0·2	+0·5	−0·2	
Mullaghmore	−0·3	−0·2	−0·8	+0·2	−0·4	
Belmullet	−0·4	0·0	−0·2	−0·1	—	No spare thermometer.
Donaghadee	−0·2	−0·2	+0·3	+0·4	−0·1	
Parsonstown	+0·5	0·0	−0·2	−0·1	—	Do. do.
Valencia	−0·8	−0·6	−0·4	0·0	—	Do. do.
Roches Point	−0·7	−0·5	−0·8	−0·1	—	Do. do.
WEEKLY WEATHER REPORT STATIONS.*						
Edgeworthstown	−0·4	−0·3	−0·4	−0·6	−0·1	Grass min. +0·3.
Kilkenny	—	—	+0·1	0·0	—	
Waterford	−0·5	−0·4	−0·1	0·0	—	
Foynes	−0·3	−0·2	−0·1	+0·8	—	
Killarney	−0·6	−0·6	−0·4	−0·2	—	Screen is only single louvred.

* Observations from the dry and wet-bulb thermometers at these stations are not used in preparing the Weekly Weather Report.

(M.O. 2267.)

REPORT of INSPECTION of the SCOTTISH STATIONS for 1887.

Barometers.

The barometers at the stations were compared with inspector's mercurial standard barometer No. 532, except those at Pinmore and at Leith. The inspector's standard was accidently broken on the journey from Glenlee to Pinmore, and consequently at the latter place the station barometer only was read. The barometer at Leith was compared with the Board of Trade barometer No. 958, which is one of the 12 barometers presented to the Scottish Meteorological Society in 1858 by the Board of Trade. It was compared with No. 532 on August 12 before setting out on the tour of inspection.

The results of the inspection are presented in the following table, which shows the "corrected" readings of the standard barometer and the uncorrected readings of the station barometers. The inspection shows that each of these important instruments remains in the excellent condition in which it was reported to be in 1885.

——	Inspector's Standard, corrected.	Not corrected.		Remarks.
		Rep. Baro.	Check Baro.	
	inches.	inches.	inches.	
Nairn - - -	29·834	29·832	29·832	
Stornoway - -	29·623	29·628	29·626	
Glenalmond - -	29·368	29·366	—	
Dundee - -	29·940	29·940	—	
Braemar - -	28·795	28·800	—	
Aberdeen - -	29·889	29·885	—	In Post Office.
Do. - -	29·785	—	29·780	In house, Braemar Place.
Swanbister - -	29·902	29·914	—	
Dunrossness - -	29·893	29·888	29·892	
Wick - - -	30·050	30·050	—	In shop.
Do. - - -	29·964	—	29·960	In house.
Dunrobin - -	30·032	30·036	—	
Laudale - -	29·477	29·476	29·458	Check barometer is 8 feet higher in flat above.
Rothesay - -	29·362	29·365	—	
Ardrossan - -	30·278	30·278	—	In Post Office.
Pinmore - -	—	29·475	—	Inspector's standard barometer broken.
Leith - - -	30·296	30·290	—	In Post Office. Check barometer, see Inspector's Notes for Station.
King's College, Aberdeen	29·900	29·896	—	

In no instance did the difference between the inspector's readings and those of the observers or their assistants exceed 0·002 inch.

Thermometers.

The various thermometers at the stations were compared in water with the standard thermometer No. 2395, to the readings of which the following "corrections" were applied, viz., at 42°, −0°·4; at 52°, −0°·4; and at 62°, −0°·3. The table gives the "corrected" readings of the standard and the *errors* of each instrument as ascertained by the comparison. In all cases these errors closely correspond with those previously ascertained.

It is now rare to find any minimum thermometer out of order by showing a detached portion near the top of the tube. At Fort Augustus, 0°·4 was lodged at the top of the tube, but in such a way that it was not detected till after a comparison with the standard had been made. At Ardrossan the small portion separated from the rest of the spirit had been detected by the observer

immediately before my visit, but he required a little instruction in the use of a small gas flame to restore it.

—	Standard No. 2,395, corrected.	Dry Bulb.	Wet Bulb.	Spare Thermometer.	Max. Thermometer.	Min. Thermometer.	Time in Water, in Minutes.	Change of Temperature	Notes.
Nairn - -	51°·3	+0°·6	+0°·6	+0°·1	−0°·1	+1°·0	75	+0°·3	
Lairg - -	51·8	+0·1	+0·1	—	0·0	+0·1	90	Uniform.	
Glencarron -	48·7	+0·1	+0·2	—	+0·1	+0·1	60	Do.	
Stornoway -	52·4	+0·5	+0·5	+0·3	−0·4	−0·4	180	Do.	
Ochtertyre -	62·7	0·0	0·0	+0·5	+0·5	−0·1	150	Do.	
Glenalmond -	60·1	+0·2	+0·3	—	+0·2	−0·1	120	Do.	
Dundee - -	61·1	+0·4	+0·6	—	+1·4	−0·2	60	+0·2	
Braemar - -	55·3	+0·4	+0·5	—	+0·6	−0·1	150	+0·2	
Aberdeen -	57·1	+0·2	+0·5	—	+0·6	0·0	120	+0·3	
Do. King's College.	57·2	+0·4	+0·3	—	+0·4	0·0	80	Uniform.	In Stevenson's screen.
Do. do.	57·2	+0·1	+0·6	—	−0·2	−0·2	80	Do.	At Tower.
Swanbister -	57·9	+0·1	+0·1	—	0·0	−0·3	60	Do.	
Dunrossness -	53·1	+0·4	+0·3	—	+0·3	−0·9	135	+0·3	
Wick - -	57·5	+0·3	+0·4	+0·4	−0·3	−0·2	60	Uniform.	
Dunrobin -	61·8	−0·4	−0·6	—	+0·5	−0·5	70	+0·3	
Fort Augustus -	57·5	+0·1	+0·1	—	+0·1	−0·1	120	Uniform.	
Laudale - -	62·0	+0·2	+0·2	—	+0·2	+0·2	105	Do.	
Rothesay -	61·2	0·0	0·0	—	+0·1	−0·4	80	Do.	
Ardrossan -	57·2	+0·1	+0·1	—	−0·3	−0·5	60	+0·2	
Glenlee - -	55·9	+0·3	+0·3	—	−0·2	+0·1	135	Uniform.	
Pinmore - -	50·9	+0·2	+0·4	—	0·0	+0·1	135	+0·3	
Leith - -	52·6	+0·1	+0·5	—	0·0	−0·5	60	Uniform.	
Marchmont -	50·8	−0·1	−0·2	—	+0·1	+0·1	140	+0·2	

Hygrometers.

Some attention was given during this inspection in preparing the following table with the view of submitting to the Meteorological Council the data from which an idea may be formed as to the condition in which these instruments were found at the time of inspection.

—	Dry Bulb.	Wet Bulb.	Difference.	Hour of Reading.	Remarks on Weather, &c.
Nairn - -	47°·4	45°·4	2°·0	6 30 p.m.	Cloudy, with passing showers.
Lairg - -	53·9	46·2	7·7	3 0 „	Clear and dry.
Glencarron -	42·5	37·5	5·0	12 45 „	Sunshine and strong wind, with flying showers of rain, hail, and sleet.
Stornoway -	—	—	—	—	New observer and position for station.
Ochtertyre -	65·5	60·2	5·3	4 30 „	Sunshine, with occasional heavy showers.
Glenalmond -	63·6	55·0	8·6	1 0 „	Strong sunshine; breezy.
Dundee - -	69·8	61·2	8·6	2 0 „	Fine and bright.
Braemar - -	51·8	44·8	7·0	1 0 „	Sunshine, with occasional showers.
Aberdeen -	54·3	52·1	2·2	7 35 „	Raining; overcast.
Do. King's College.	58·4	50·2	8·2	12 15 „	Fine and bright (in garden).
Do. do.	58·1	48·1	10·0	12 30 „	Do. (at tower).
Swanbister -	54·1	51·7	2·4	9 40 a.m.	Dull and showery.
Dunrossness -	50·0	47·3	2·7	10 30 „	Slight drizzle, with blinks of sunshine.
Wick - -	55·5	53·9	1·6	4 30 p.m.	Dull and misty, but beginning to clear.
Dunrobin -	58·4	55·8	2·6	11 45 a.m.	Sun breaking through mist.
Fort Augustus -	58·7	55·9	2·8	8 45 „	North wind, with mist.
Laudale - -	64·0	59·1	4·9	2 15 p.m.	Sunshine, with flying showers.
Rothesay -	62·2	57·8	4·4	4 0 „	Half clouded, with occasional showers.
Ardrossan -	55·7	51·2	4·5	8 20 a.m.	Clear and bright.
Glenlee - -	55·8	51·3	4·5	12 30 p.m.	Clearing after heavy rain.
Pinmore - -	60·0	52·2	7·8	1 40 „	Fine and breezy.
Leith - -	54·9	50·5	4·4	3 0 „	Overcast with haze.
Marchmont -	42·9	41·7	1·2	9 10 a.m.	A comparatively fair interval of 20 minutes during heavy rain of some hours' duration.

The instruments were all read in precisely the same way, viz., immediately on opening the thermometer screen; the dry and wet bulbs were rapidly read, and a note was made at the same time of the state of the weather. In each case I was satisfied that the wet bulb was in good order, the observed differences being due to the different hours, and the hygrometric condition of the air at the time.

NOTES on the STATIONS.

Nairn, May 17.—The instruments were in very good order. Special attention was drawn to the errors referred to in the notes sent from the Meteorological Office, and the course to be systematically pursued in order to secure their non-repetition in future was explained at length. In about three weeks after my visit Miss Penny, who has been sometime assistant in a school near Banff, returns to be first assistant at Delnies School under Mrs. Penny, when the observations will be immediately under her charge. Each of the observers can read the instruments correctly and make up a weather telegram with correctness and despatch.

Lairg, May 18.—The four thermometers now in use were quite recently compared at Kew and the corrections are very trifling. The method of reading the new maximum thermometer, which was not understood, was explained and is now understood. The thermometer screen is to be placed on new posts, and arrangements made by Mr. Ross to prevent shaking of the maximum and minimum thermometers during high winds, which has probably been of occasional occurrence in the past. The minimum thermometer previously in use was found to have 2°·0 of spirit detached from the column. This instrument was correct when the station was inspected in September 1886. The observing instruments were all in good order.

Glencarron, May 19.—The instruments were in excellent order and read with much intelligence. This is a well-appointed station, possessing, in addition to the usual instruments, a barograph and a thermograph, the latter in a Stevenson's screen close to the other thermometers, and three snow gauges, of 5, 10, and 15 inches diameter respectively, which are read daily when snow has fallen. Glencarron is situated in the valley of the Carron, which is steep and narrow, mountains rising on all sides, some of them to heights exceeding 3,000 feet. The situation is absolutely open on all sides.

Stornoway, May 20 and 21.—I spent nearly the whole of Friday and Saturday in removing the instruments to their new positions at Nicholson Institution, and in seeing that Mr. Forbes, the new observer, was thoroughly prepared to serve as reporter. Mr. Forbes showed a remarkable readiness in reading the instruments and making up the daily telegrams, and gives good promise of being an excellent observer. Before I left, Miss Riddoch, his sister-in-law, read the thermometers and set the vernier correctly, and three weeks thereafter I was informed that she had learnt to read all the instruments and prepare the daily telegram.

Ochtertyre, July 13.—The instruments here are remarkably well kept and observed, and a duplicate set is kept. There is also a snow gauge. The grass plot where they are placed is on a slope facing the south, and is open to the sun nearly the whole day. The grounds are richly wooded with trees and shrubs, and are thus less open to the winds than is generally the case.

Glenalmond, July 14.—The instruments are well kept and carefully observed. Mr. Reid is assisted by Mr. Delius, master of foreign languages, with whose assistance every effort will be made to observe the 9 p.m. readings, but the engagements of both observers in the college will preclude anything like a continuous record being made at this hour.

Dundee, July 15.—The instruments were in very good order, and evidently are carefully attended to. The observations are made correctly and expertly. The wind estimations at the time of my visit were again made correctly.

Braemar, August 13.—The instruments were found to be in excellent order, and both Mr. Aitken and Miss Kelly, the assistant, are remarkably good observers.

Aberdeen, August 15.—The instruments were in excellent order, and the observations made intelligently and accurately. The thermometer screen had been painted a few days before my visit. An extreme reading of the barograph, showing the extreme value, highest or lowest, will in future be forwarded to the Office.

Swanbister, August 18.—The condition of the instruments and the methods of observing were such as to leave nothing to be desired. Mrs. Fortescue read the barometer and other instruments with exactness. The observations of the direction of the wind no doubt approximate closely to the direction of the district; if there be any deviation from this, it can be no more than a slight modification due to the low ridge, lying from N.W. to S.E., on which the anemometer is placed. This instrument appeared to be in very good order.

Dunrossness, August 20.—The instruments were in very good order, and the observations made carefully and correctly by the three observers. Miss Brand now makes up the daily telegram correctly and with tolerable despatch. Much attention has been given by Mr. Brand and assistants to observations of the force of the wind by the hand anemometer, and in every case, without exception, the estimated force is written down before the observation with the anemometer is made. So far as Mr. Brand remembers, every case of difference between the estimated and the observed force, amounting to three miles per hour or more, was explained by short-lived gusts, or temporary lulls, or diminished force during the revolutions of the anemometer.

Wick, August 23.—The instruments were in very good order, and intelligently observed. The thermometer screen had been painted a month before my visit, and was in very good condition. As regards the late arrival of the telegrams in London, Mr. and Miss Sinclair promise that every effort will be made to have them delivered at the post office not later than 8.30 a.m.

Dunrobin, August 24.—The instruments were in good condition, and the observations are made with care. The rain-gauge was slightly deformed, but was put right. Observations of wind-force will probably be commenced soon.

Fort Augustus, August 26.—A portion of spirit, equal to 0°·4, was separated from the column of the minimum thermometer and lodged at the top of the tube. With the help of the observer it was put right. With this exception the instruments were in excellent order, and the observations made with much intelligence. The positions of the various instruments are remarkably good. The observations are made here at 8.45 instead of 9 o'clock, as the regulations of the Monastery preclude the observations being taken at the latter hour.

Laudale, August 29.—The instruments were in very good order, and well observed. The "weather initials" were carefully gone over, and will in future be strictly adhered to, and such observations as those of "frost" will be entered in the "Remarks" column. As regards the back schedules from January 1886, Mr. Fletcher will have them copied and transmitted as soon as possible.

Rothesay, August 30.—Everything at this station was in excellent order, and the observations are made with much care.

Ardrossan, September 8.—Before opening the thermometer screen, Mr. Mayes informed me that on the previous day he had observed a small portion of the spirit of the minimum thermometer detached, but had been unable to put it right. This proved to be 0°·6. It was put right in his presence, and partly with his assistance, by means of a small gas flame. The rain-gauge was slightly deformed, but was set right. Otherwise the instruments were in good order, and there is much interest and intelligence in the work of observing.

Glenlee, September 26.—The instruments were in very good order, and were correctly and intelligently observed. The height above mean sea level, determined from a B. M. a little way off, is 206 feet. The station is on a low, rather broadish ridge, between two streams which join the Ken near this place. It seemed probable from the appearance of the district that W.N.W. winds will unduly preponderate over the winds immediately contiguous to them, but otherwise the winds will fairly represent the general direction of that part of Scotland.

Pinmore, September 29.—The instruments were all in particularly good order. The assistant observer has recently been engaged as apprentice gardener. At present he reads the thermometer correctly to whole degrees, and it is expected that he will soon be able to read all of them in the usual way. Mr. Donald had been called to Girvan the morning of my visit, where I saw him for half an hour on my way to Ayr.

Leith, October 5.—The instruments here are all well kept, and the observations accurately made. A ventilator was added to the thermometer screen since last inspection, and a new glass measure for the rain-gauge has been got. Mr. Hay's family removed in May to Hawthornbank Place, and the check barometer was found to be correct in its new position.

Marchmont, October 8.—The instruments are well placed and in excellent order, and the observations are carefully made. The sun shines on the thermometer box at all hours and seasons, except for about three weeks in the depth of winter, when they are shaded for a brief interval after sunrise by a clump of ash, birch, and sycamore trees about 100 yards off.

The Observatory, King's College, Aberdeen, August 15.—The attached thermometer of the standard barometer was found sometime ago to have slipped down, and consequently reading too low. It was correct when compared with inspector's standard in 1885, but as I did not carry a barometer with me in 1886, there was no comparison that year. The accident had taken place some time after 1885. It would assist in detecting an error of this sort if the stems of the attached thermometer were always graduated, which is seldom the case. With this exception all the instruments were in excellent order, and excellently manipulated and observed.

(Signed) A. BUCHAN.

REPORT on INSPECTIONS, 1887.

Falmouth Observatory, visited August 24.—The instruments at this observatory were found in good order, the lenses and fittings of both barograph and thermograph being cleaned and the clocks oiled.

The attached thermometer of the standard barometer was found to be properly fitted, and to have its graduations engraved upon its stem, but owing to its having risen through age, a correction of −0°·6 is now requisite to be applied to its scale readings.

The wet-bulb thermometers were all in good order, clean muslin and threads having been recently fitted.

The following corrections were determined at temperature of 66° :—

Dry standard No. 383 −0°·7; wet No. 388 −0°·4.
Maximum M.O. 104 −0°·3; minimum M.O. 308 −0°·1.

Notes were also made of the zero values both for summer and winter temperatures.

The anemograph was dismounted temporarily and thoroughly cleaned; the orientation showed an irregularity in the working of the direction pencil. This was found to be due to the shaft having split asunder at the clamping piece, and was rectified by having a brass collar soldered on, and filing the shaft down a little. My attention was called to an error in the adjustment of the pricker by which means the setting of the instrument differed by some minutes from the times as indicated by the curves on the paper; this defect was rectified by packing the fitting piece of the pricker up with a morsel of paper, and instructions were given to the assistant to press the teeth of the cylinder into proper gear when starting the instrument, as the amount of backleash is rather large.

Owing to the unsatisfactory nature of the time service of the observatory, which is dependent on a local watchmaker now on the point of relinquishing business, I think it would be desirable to have a small transit instrument (say one of Latimer Clark's portable transits) fitted up at the observatory in order that the staff might determine their clock errors directly.

A close examination was made of the different rain-gauges and squeezes made of the funnels. The exposure of all three is good on all sides, there being no trees or shrubs near to exert an injurious effect; the only possible sources of difference are that the slightly broader edge of the funnel of the Beckley may cause splashing, and the allowance for incomplete discharge of the siphon made in tabulating may be somewhat inadequate.

The pencil used now is an ordinary lead pencil, a holder of larger size than usual having been fitted; the spring, however, appeared to be pressing harder upon the paper than was desirable.

Necessary instructions were given to Mr. Kitto to make certain alterations in his tabulations in accordance with memoranda supplied in the inspection notes handed me.

Valencia Observatory, visited September 5–10.—The photography at this observatory has been very unsatisfactory during the summer, on account of the inadequate water supply caused by the drought, and also to its very impure quality. The stock of waxed paper at the observatory is now approaching exhaustion, and Mr. Cullum hopes to be permitted to make use of A. G. B. paper after it is all expended. I gave certain instructions as to fitting up ruby blinds and employing ruby lanterns in the photographic work if the new process is adopted, as the present appliances are inadequate for working with a more sensitive medium than that at present in use. Meanwhile the results obtained are somewhat better than those got some months back.

A serious difficulty with the new paper will be the exclusion of light from the thermograph traces, the blackening varnish having greatly decayed on the thermometer stems. I took down both thermometers and tried to remove the old paint and apply new, but was unable for want of materials to perform the operation satisfactorily. I, however, instructed Mr. Cullum in the method of performing the various processes, so that on the proper solvent, varnish, brush, and paint being forwarded to Valencia, he will be able to do what is necessary himself.

At the time of dismounting the wet-bulb thermometer I carefully examined the tube at the point where the definition of the curve is defective, but found the tube so roughened by the abrasion previously reported that nothing can be done to rectify the defect.

The metal fittings of the instrument have corroded a good deal, and the upper band of the wet-bulb standard is broken quite away. I temporarily secured it by a wire binding.

The corrections to the thermometers were found to be at 60° :—

Dry-bulb standard K. S. 399, − 0°·8; wet-bulb standard K. S. 398, − 0°·6.

Maximum M. O. 1,003, − 0°·0; minimum, 2,497, − 0°·3.

The minimum figure scale differs nearly 1° from the graduations on the tube.

The wet-bulbs were found kept in good order, but the lamp-wicks are much discoloured from corrosion derived from the copper water-tank.

The barograph was dismounted and cleaned, and the air-tube in the cistern found to have the plug slightly corroded; this was removed, and the air-hole cleared by means of a knitting needle. The tube of the standard barometer is also much corroded, the bands holding the attached thermometer were broken away. The tube, which is not divided on the stem, was detached from its scale, and its error found to be −1°·7. A new instrument is much wanted.

The anemograph was dismounted and cleaned, but is in good order, and, with the exception of the needle lubricators to the fan shaft, which have both proved failures, does not call for special remark. The Beckley rain-gauge was also in good order, with the exception of a defective pipe. The tube which conveys the rain from the funnel to the receiver is made of a very soft composition metal, which becomes so plastic in hot weather as to be unable to support its own weight. It then drops until it rests upon the floating receiver, thereby vitiating the rain record.

I should recommend the substitution of a brass or copper tube at the earliest convenience, and also that a Stonyhurst discharger and new pencil-holder should be fitted at the same time, in order that more distinct traces might be obtained than those now procured.

As at Falmouth, I examined the gauges in order to find if possible a cause for the disagreements occasionally observed between the indications of the Beckley and check gauges, but nothing appeared sufficiently marked to be assigned as a cause of error, and it appears probable that rain-gauges side by side may differ in their catches during gusty weather and heavy falls, from natural causes.

I inspected the electrical anemograph, working at the time of my visit under the immediate care of a postal telegraph official stationed at Valencia in sole charge of it, but found its action was very unsatisfactory.

(Signed) G. M. Whipple.

Kew Observatory, October 1887.

DEAR SIR, Kew Observatory, October 1887.

I BEG to hand you herewith my report and inspection notes regarding the self-recording instruments of the observatories at Stonyhurst and Aberdeen.

Stonyhurst, visited September 28–29.—At this observatory the whole of the instruments were in a satisfactory condition and call for no special remark.

The standard dry and wet thermometers as well as the maximum and minimum were carefully examined with the standard K.S. 642, and the following corrections were determined at 60°.

Dry bulb 619	-	$-0^{\circ}\cdot 2$
Wet bulb 382	-	$-0\cdot 4$
Maximum M.O. 439	-	$-0\cdot 4$
Minimum B.T. 501	-	$+0\cdot 1$

Aberdeen, October 1–7.—Here I found everything working well. Both the barograph and thermograph clocks were taken to pieces and the usual cleaning performed.

My attention having been called to the attached thermometer of the standard barometer, I found that a temporary tube divided to every 2 degrees on the glass stem had been fitted up by Professor Nevin, as a substitute for the original thermometer which is an undivided one, and now quite useless, as the brass band fixing it to the outer casing of the barometer (which in itself is much corroded) is quite worn away, and in consequence there is no means of securing the tube to the ivory degree scale.

I would therefore suggest that another thermometer divided on the glass stem to single degrees and ranging from $+10^{\circ}$ to 120° be supplied, together with a small bracket for supporting it be sent to the observatory. (For the dimensions of bracket, &c., see sketch given on inspection notes.)

The barograph was in good order and the air plug of cistern quite free from dirt or other obstruction. Its thermometer was tested and found to read 2° too high.

With regard to the large differences noted in the barograph tabulations and referred to in a letter to Professor Nevin of May 9th, a special report is herewith submitted in the inspection notes.

Anemograph.—The whole of the external parts were dismounted and thoroughly cleaned and oiled. The instrument was in a satisfactory condition, with the exception of the fans and screw of spindle, which are very much worn, so that it is very questionable whether the fans will hold together during the coming winter. I would therefore respectfully beg to draw the especial attention of the Council to Mr. Whipple's report of last year concerning these defects.

The dimensions of the spindle to which the fans are fixed are appended to inspection notes, as well as certain measurements as to height of cups above the roof of the astronomical observatory.

The orientation was examined before and after dismounting and cleaning, and the sheet containing the results is forwarded herewith.

"Squeezes" of both the self-recording and spare rain-gauge funnels are also enclosed. The clock of the former instrument only required oiling, as it had been thoroughly cleaned (prior to my visit) at the time of attaching a new line to weight.

The following are the corrections obtained by comparison of the thermometers with the Kew Standard 642 at 55°:—

Dry-bulb 458	-	$-0^{\circ}\cdot 15$
Wet-bulb 395	-	$-0\cdot 6$
Maximum M.O. 1,002	-	$+0\cdot 1$
Minimum M.O. 89	-	$+0\cdot 1$

Yours, &c.
(Signed) T. W. BAKER.

R. H. Scott, Esq., F.R.S.

Submitted the following letter (Minutes, p. 9):—

(M.O. 2268.) Kew Observatory, Richmond, Surrey,
October 19, 1887.

DEAR MR. SCOTT,

HEREWITH I beg to hand you an album containing prints of the cloud pictures taken at this observatory during the past summer, in accordance with your instructions of $\frac{\text{April 21}}{\text{M.O. 905}}$. We devoted our attention especially to the photography of cirrus clouds, but found the bright weather of the early summer very unfavourable for such work, and therefore were only able to procure 24 out of the 25 sets of pictures which we received instructions to take.

The negatives are retained at the observatory until further instructions are received from your Office.

No reductions of any kind have been undertaken by us of the present set of cloud prints.

Yours, &c.
(Signed) G. M. WHIPPLE.

R. H. Scott, Esq., F.R.S.

Submitted—The following reports on the forecasts for July, August, and September 1887 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

JULY.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	54	46	50	85
„	b	42	27	35	
„	c	4	12	8	
„	d	0	15	7	
Scotland, E.	a	50	50	50	83
„	b	46	19	33	
„	c	4	23	13	
„	d	0	8	4	
England, N.E.	a	44	42	43	88
„	b	48	42	45	
„	c	8	4	6	
„	d	0	12	6	
England, E.	a	44	62	53	83
„	b	52	8	30	
„	c	4	15	10	
„	d	0	15	7	
Midland Cos.	a	52	54	53	85
„	b	40	23	32	
„	c	8	4	6	
„	d	0	19	9	
England, S.	a	50	72	61	86
„	b	38	12	25	
„	c	12	8	10	
„	d	0	8	4	
Scotland, W.	a	42	46	44	81
„	b	39	35	37	
„	c	15	8	12	
„	d	4	11	7	
England, N.W.	a	50	46	48	79
„	b	38	23	31	
„	c	8	23	15	
„	d	4	8	6	
England, S.W.	a	42	54	48	81
„	b	35	31	33	
„	c	19	11	15	
„	d	4	4	4	
Ireland, N.	a	38	38	38	84
„	b	46	46	46	
„	c	12	8	10	
„	d	4	8	6	
Ireland, S.	a	38	27	33	79
„	b	35	58	46	
„	c	27	11	19	
„	d	0	4	2	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	65	36	51	80
„	b	26	32	29	
„	c	6	16	11	
„	d	3	16	9	
Scotland, E.	a	61	52	57	86
„	b	29	29	29	
„	c	10	10	10	
„	d	0	9	4	
England, N.E.	a	58	48	53	92
„	b	42	36	39	
„	c	0	13	7	
„	d	0	3	1	
England, E.	a	45	58	52	81
„	b	45	13	29	
„	c	10	16	13	
„	d	0	13	6	
Midland Cos.	a	61	58	60	86
„	b	36	16	26	
„	c	3	10	6	
„	d	0	16	8	
England, S.	a	42	48	45	79
„	b	42	26	34	
„	c	16	23	20	
„	d	0	3	1	
Scotland, W.	a	61	45	53	86
„	b	26	39	33	
„	c	7	10	8	
„	d	6	6	6	
England, N.W.	a	65	58	62	88
„	b	23	29	26	
„	c	6	10	8	
„	d	6	3	4	
England, S.W.	a	58	48	53	79
„	b	26	26	26	
„	c	6	16	11	
„	d	10	10	10	
Ireland, N.	a	42	42	42	81
„	b	45	32	39	
„	c	13	13	13	
„	d	0	13	6	
Ireland, S.	a	39	39	39	76
„	b	35	39	37	
„	c	23	16	20	
„	d	3	6	4	

SUMMARY.

British Isles	a	46	49	48	83
„	b	42	29	35	
„	c	11	12	12	
„	d	1	10	5	
British Isles	a	54	48	51	83
„	b	34	29	32	
„	c	9	14	11	
„	d	3	9	6	

The letters used have the following signification :—

a compiete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

AUGUST.

3.30 P.M.

DISTRICTS.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
SCOTLAND, N.	a	48	67	58	
,,	b	26	22	24	82
,,	c	7	4	5	
,,	d	19	7	13	
SCOTLAND, E.	a	45	59	52	
,,	b	44	22	33	85
,,	c	4	4	4	
,,	d	7	15	11	
ENGLAND, N.E.	a	59	59	59	
,,	b	33	26	30	89
,,	c	8	0	4	
,,	d	0	15	7	
ENGLAND, E.	a	70	67	69	
,,	b	22	19	20	89
,,	c	4	3	4	
,,	d	4	11	7	
MIDLAND COS.	a	70	63	67	
,,	b	19	19	19	86
,,	c	11	3	7	
,,	d	0	15	7	
ENGLAND, S.	a	67	52	60	
,,	b	30	33	31	91
,,	c	0	0	0	
,,	d	3	15	9	
SCOTLAND, W.	a	56	37	47	
,,	b	37	41	39	86
,,	c	4	7	5	
,,	d	3	15	9	
ENGLAND, N.W.	a	63	52	58	
,,	b	26	37	31	89
,,	c	7	0	4	
,,	d	4	11	7	
ENGLAND, S.W.	a	67	67	67	
,,	b	22	15	19	86
,,	c	11	7	9	
,,	d	0	11	5	
IRELAND, N.	a	41	63	52	
,,	b	33	26	30	82
,,	c	22	4	13	
,,	d	4	7	5	
IRELAND, S.	a	48	56	52	
,,	b	37	29	33	85
,,	c	15	0	8	
,,	d	0	15	7	

8.30 P.M.

DISTRICTS.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
SCOTLAND, N.	a	55	65	60	
,,	b	29	13	21	81
,,	c	13	19	16	
,,	d	3	3	3	
SCOTLAND, E.	a	42	45	44	
,,	b	49	36	42	86
,,	c	6	13	10	
,,	d	3	6	4	
ENGLAND, N.E.	a	68	58	63	
,,	b	23	32	28	91
,,	c	6	7	6	
,,	d	3	3	3	
ENGLAND, E.	a	62	52	57	
,,	b	32	32	32	89
,,	c	3	6	5	
,,	d	3	10	6	
MIDLAND COS.	a	61	55	58	
,,	b	32	32	32	90
,,	c	7	3	5	
,,	d	0	10	5	
ENGLAND, S.	a	65	55	60	
,,	b	26	39	33	93
,,	c	6	0	3	
,,	d	3	6	4	
SCOTLAND, W.	a	49	39	44	
,,	b	45	39	42	86
,,	c	6	3	5	
,,	d	0	19	9	
ENGLAND, N.W.	a	48	45	47	
,,	b	39	23	31	78
,,	c	10	6	8	
,,	d	3	26	14	
ENGLAND, S.W.	a	58	49	54	
,,	b	20	19	19	73
,,	c	19	6	13	
,,	d	3	26	14	
IRELAND, N.	a	42	55	49	
,,	b	32	29	30	79
,,	c	16	6	11	
,,	d	10	10	10	
IRELAND, S.	a	55	49	52	
,,	b	23	29	26	78
,,	c	13	6	10	
,,	d	9	16	12	

SUMMARY.

BRITISH ISLES	a	58	58	58	
,,	b	30	26	28	86
,,	c	8	3	6	
,,	d	4	13	8	
BRITISH ISLES	a	55	52	54	
,,	b	32	29	30	84
,,	c	10	7	9	
,,	d	3	12	7	

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

SEPTEMBER.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	42	48	45	81
,,	b	35	36	36	
,,	c	15	16	15	
,,	d	8	0	4	
Scotland, E.	a	24	56	40	76
,,	b	44	28	36	
,,	c	20	16	18	
,,	d	12	0	6	
England, N.E.	a	40	36	38	82
,,	b	40	48	44	
,,	c	8	12	10	
,,	d	12	4	8	
England, E.	a	58	42	50	81
,,	b	23	38	31	
,,	c	15	8	11	
,,	d	4	12	8	
Midland Cos.	a	54	54	54	81
,,	b	23	31	27	
,,	c	12	15	14	
,,	d	11	0	5	
England, S.	a	58	54	56	87
,,	b	31	31	31	
,,	c	11	15	13	
,,	d	0	0	0	
Scotland, W.	a	44	64	54	78
,,	b	32	16	24	
,,	c	20	16	18	
,,	d	4	4	4	
England, N.W.	a	40	68	54	82
,,	b	36	20	28	
,,	c	12	12	12	
,,	d	12	0	6	
England, S.W.	a	54	62	58	81
,,	b	27	19	23	
,,	c	8	12	10	
,,	d	11	7	9	
Ireland, N.	a	24	52	38	74
,,	b	40	32	36	
,,	c	20	8	14	
,,	d	16	8	12	
Ireland, S.	a	28	48	38	72
,,	b	36	32	34	
,,	c	24	4	14	
,,	d	12	16	14	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	53	47	50	80
,,	b	27	33	30	
,,	c	13	17	15	
,,	d	7	3	5	
Scotland, E.	a	37	40	39	84
,,	b	40	50	45	
,,	c	17	10	13	
,,	d	6	0	3	
England, N.E.	a	50	43	47	80
,,	b	33	33	33	
,,	c	10	17	13	
,,	d	7	7	7	
England, E.	a	54	53	54	82
,,	b	30	27	28	
,,	c	13	17	15	
,,	d	3	3	3	
Midland Cos.	a	50	67	59	82
,,	b	27	20	23	
,,	c	20	10	15	
,,	d	3	3	3	
England, S.	a	50	54	52	82
,,	b	30	30	30	
,,	c	17	13	15	
,,	d	3	3	3	
Scotland, W.	a	33	44	39	80
,,	b	40	43	41	
,,	c	20	10	15	
,,	d	7	3	5	
England, N.W.	a	43	60	52	75
,,	b	20	27	23	
,,	c	27	10	19	
,,	d	10	3	6	
England, S.W.	a	57	53	55	80
,,	b	23	27	25	
,,	c	10	10	10	
,,	d	10	10	10	
Ireland, N.	a	27	50	39	76
,,	b	37	37	37	
,,	c	23	10	16	
,,	d	13	3	8	
Ireland, S.	a	33	40	37	77
,,	b	33	47	40	
,,	c	17	3	10	
,,	d	17	10	13	

SUMMARY.

British Isles	a	43	53	48	80
,,	b	33	30	32	
,,	c	15	12	13	
,,	d	9	5	7	
British Isles	a	44	50	47	80
,,	b	31	34	33	
,,	c	17	12	14	
,,	d	8	4	6	

Mr. Scott reported that, at the request of the Hydrographer, forecasts had been supplied gratis to Captain Long, in command of the torpedo flotilla at the Downs during the August Manœuvres.—Approved.

Submitted the following:—

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the Meeting of Council, held on 8th June 1887,—naming the Hour of Issue, the Coasts warned, the Gales experienced, and the Result, as to the Character of the Warning.

1. WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any), and Approximate Time of occurrence.	Result. Character of Signal.†
1887.				
July 26th, 10 a.m.	Ireland, S.	South cone	Strong S.Wly. winds, on evening of 26th.	B
„ „	„ E.*	„	„ „ „	B
„ „	Scotland, W.*	„	Moderate S.S.Ely. gale, on evening of 26th.	B
„ 0.10 p.m.	„ E.	„	Strong S.Wly, winds, on evening of 27th.	B
„ „	England, N.W.	„	Strong Sly. winds and moderate gales, on night of 26th and morning of 27th.	B
„ „	„ W.	„	Strong S.Wly. winds, early on 27th	B
„ „	„ S.W.	„	„ „ „	B
„ 7.10 p.m.	England, S.	„	Strong winds and moderate gales from S.W., on 27th.	B
„ „	„ S.E. (mouth of Thames only).	„	Strong S.Wly, winds, on 27th (gale at C. Gris Nez).	B
July 28th, 10 a.m.	Ireland, S.	„	Moderate to fresh Sly. gales, afternoon of 28th.	A
„ „	„ E.*	„	Strong winds and moderate gales from S.W., on evening of 28th.	B
„ 7.40 p.m.	Scotland, E.	„	Moderate S.Wly. gale, on night of 29th.	B
„ „	„ W.*	„	Strong squally S.Wly. winds, morn- of 29th.	B
„ „	England, N.W.	„	„ „ „	B
Aug. 9th, 7.15 p.m.	Scotland, E. (from Aberdeen northwards).	North cone	N.Wly. gales, early on 10th (gale not felt on our other coasts).	A
Aug. 25th, 7.30 p.m.	Ireland, S.	South cone	Strong winds and moderate gales from Swd. early on 26th.	B
„ „	„ E.*	„	Strong Sly. winds, on 26th	B
Aug. 27th, 7.35 p.m.	Ireland, S.	„	Neither gales nor strong winds	C
	„ E.	„		C
			(The depression arrived, but "spread out" so that gradients were never steep.)	
Aug. 30th, 1.5 p.m.	Ireland, S.	South cone	Wind lulled immediately on issue of warning.	C
„ „	„ E.	„	Neither gales nor strong winds	C
„ „	Scotland, W.	„	„ „ „	C
„ „	England, N.W.	„	„ „ „	C
„ „	„ W.	„	Fresh S.Wly. gale, 4 p.m. on 30th	A
„ [„	„ S.W.	„	Moderate to fresh gales from S.W., on evening of 30th.	A
			(This, again, is an instance of a depression arriving and spreading out so that in the neighbourhood of its centre no gale was experienced.)	
Sept. 1st, 10.30 a.m.	Ireland, S.	South cone	Moderate to fresh Sly. gales, on afternoon 1st, shifting to N.W. at night.	A
„ „	„ E.*	„	Moderate gales only recorded; directions as above.	B

* Information available too scanty to give very reliable results for these coasts.
† A = complete success, *i.e.* justified by occurrence of gales of force 8 or more.
B = partial „ „ „ winds of forces 6 and 7.
C = failure, *i.e.* not justified by either gales or strong winds.

Day and Hour of Issue.	Coasts warned.	Signals hoisted.	Gales experieneed (if any), and Approximate Time of occurrence.	Result. — Character of Signal.
1887.				
Sept. 1st. 10.30 a.m.	England, W. -	South cone	"Whole gale" from S.S.W., night of 1st.	A
„ „ -	„ S.W. -	„	"Strong gale" from S, afternoon of 1st, subsequently veering to W.	A
„ „ -	„ S. -	„	"Strong" to "Whole" gales from S.W., night of 1st and morning of 2nd.	A
„ 0.20 p.m. -	„ S.E. -	„	"Strong gale" as above - -	A
„ 3.55 p.m. -	Scotland, W. -	„	Neither gales nor strong winds -	C
„ „ -	England, N.W. -	„	Moderate gale from W. on afternoon of 2nd.	B
			(The centre of the depression took a more Sly. course than was anticipated, so that the W. of Scotland just escaped the gales).	
Sept. 5th. 10 a.m. -	Ireland, S. -	South cone	Strong winds and moderate gales from W. on afternoon 5th.	B
„ „ -	England, N.W. (Bangor only).	„	Strong winds and moderate gales from S.W.	B
„ „ -	„ W. -	„	Moderate gale from W.S.W., evening of 5th.	B
„ „ -	„ S.W. -	„	Wind lulled after issue of signals -	C
„ „ -	„ S. -	„	Moderate Wly. gales, evening of 5th	B
„ „ -	„ S.E. (mouth of Thames only).	„	Moderate S.Wly. gales, night of 5th	B
„ 7.30 p.m. -	Ireland, E. -	„	„ „ „ -	B
„ „ -	Scotland, W. -	„	Neither gales nor strong winds -	C
„ „ -	England, N.W. (excepting Bangor).	„	Fresh S.Wly. gales evening of 5th, lulling later.	C
„ „ -	„ S.E. (excepting mouth of Thames).	„	Neither gales nor strong winds -	C
„ „ -	„ E. (Hull to Cromer).	„	„ „ „ -	C
			(This depression filled up rapidly on striking our N.W. coasts on evening of 5th; the gales anticipated consequently did not blow in several districts.)	
Sept. 8th, 3.15 p.m. -	Ireland, S. (Galway only).	South cone	Moderate to fresh gale from Swd., evening of 8th.	A
„ „ -	„ E.* (Belfast only).	„	No gale reported, but strong winds were evidently felt.	? B
„ „ -	Scotland, E. (from Aberdeen Nwds.).	„	Fresh to moderate Sly. gales, on night of 8th.	A
„ „ -	„ W.* -	„	Fresh Sly. gale, night of 8th -	A
„ „ -	England, N.W. (northern part only).	„	Moderate Sly. gale on morning of 9th.	B
„ 5.0 p.m. -	Ireland, S. (excepting Galway).	„	Neither gale nor strong wind -	C
„ „ -	„ E.* (excepting Belfast).	„	„ „ „ -	C
„ „ -	England, N.W. (southern part).	„	Strong S.Wly. winds, during night of 8th.	B
„ 7.0 p.m. -	Scotland, E. (south of Aberdeen).	„	Apparently strong Sly. winds, night of 8th.	? B
„ „ -	England, W. -	„	Neither gales nor strong winds -	C
„ „ -	„ S.W. -	„	„ „ „ -	C
„ „ -	„ E. (Tweed to Humber).	„	Moderate gale from S.W., afternoon of 9th.	B
			(The depression moved Nwds. outside our Wn. coasts at a greater distance than was anticipated.)	

Day and Hour of Issue.	Coasts warned.	Signals hoisted.	Gales experienced (if any), and approximate Time of their Occurrence.	Result. Character of Signal.
1887.				
Sept. 25th, 6.50 p.m. -	Ireland, S. (Galway only).	North cone	Neither gales nor strong winds -	C
" " -	" E. (Belfast only).	"	" " " " -	C
" " -	Scotland, E. -	"	" " " " -	C
" " -	" W. -	"	" " " " -	C
" " -	England, N.W. -	"	" " " " -	C
" " -	" E. (Tweed to Humber).	"	" " " " -	C
			(The baric fall was *very* decided, but the depression spread out quickly, so that on arriving it proved to be shallow. Signals were lowered early next morning.)	
Oct. 9th, 7.40 p.m. -	Ireland, S. -	North cone	Neither gales nor strong winds -	C
" " -	" E. -	"	Moderate N.Ely. gales, evening of 9th.	C
" " -	Scotland, E. (Tweed to Moray Firth).	"	Strong N.Ely. and Nly. winds, on 10th and 11th.	B
" " -	" W. -	"	Neither gales nor strong winds -	C
" " -	England, N.W. -	"	Strong Nly. winds on morning of 10th.	B
" " -	" W. -	"	" " "	B
" " -	" S.W. -	"	Moderate to fresh Nly. gales, on morning of 10th.	A
" " -	" E. -	"	Nly. gales, on evening of 10th -	A
Oct. 14th, 10.0 a.m. -	Ireland, S. -	North cone	Strong Nly. winds at intervals, on 14th.	B
" " -	" E. -	"	Moderate N.Ely. gale, mid-day, 14th	B
" " -	England, W.* -	"	Fresh Nly. and N.Wly. breezes only.	C
" " -	" S.W. -	"	Moderate N.Wly. gale, afternoon and evening 14th.	B
" " -	" S. -	"	Strong Nly. winds only on *our* coasts, but severe Nly. gale on French side of Channel, on evening 14th.	A
" " -	" S.E. -	"	Fresh gale N.W., afternoon 14th -	A
" " -	" E. -	"	Strong gale from Nwd., afternoon of 14th.	A
Oct. 19th, 1.10 p.m. -	Ireland, E.* (Belfast only).	South cone	Neither gales nor strong winds -	C
" " -	Scotland, E. (from Aberdeen Nwds.).	"	Strong Wly. winds and gales; "very rough all night" of 19th.	A
" " -	" W. -	"	Moderate S.Wly. gale on, night of 19th.	B
" " -	England, N.W. (northern part).	"	Neither gales nor strong winds -	C

2. There have been no gales experienced without being warned for.

(Signed) FREDC. GASTER.

Submitted — The following reports of work during July, August, September 1887:—

MARINE ROOM.

October 20, 1887.

Examined 49 new logs and 3 lighthouse registers.

North Atlantic Weather Charts.

Charts to June 17, 1883, reduced, prepared, and forwarded to the lithographer. Proofs of lithographed charts to May 21 received, and those for May 15 passed for press, leaving three sheets (to May 24) to complete Part III.

Obtaining the lowest barometer in the centres of depressions during August 1883.

Measuring the extent of areas under various ranges of barometric pressure for August 1882 and February 1883.

The female clerks chiefly engaged on the reduction and preparation for the lithographer of the charts for July and August 1883; also preparing and charting the data for September 1-3, an extension of the original period designed to complete the track of the great disturbance which was crossing the British Isles between these dates.

General.

Collecting and preparing data for the discussion of the cyclones experienced between May 15 and June 25, 1885, in the Red Sea, Gulf of Aden, and Arabian Sea. For this discussion data, more or less complete, have been received from 194 ships, and three-fourths of the observations for 10 a.m. (the hour selected) are ready for charting. All important remarks bearing upon the weather have also been extracted. The logs of other ships are expected from India and elsewhere. The observations contained in the Indian Daily Weather Reports have been charted for a part of the period.

Discussion of Red Sea data, and preparation of additional Admiralty logs for January to compare with Office, Dutch, and P. and O. data.

Indexing data in ocean 10-degree squares.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE,
Marine Superintendent.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

(July to September 1887.)

Quarterly Weather Report, 1879, *Part I.*—Revised, and sent "for Press" (since published).

Monthly Weather Report:—

1886, *December.*—Printed and published.

1887, *January.*—Nearly ready for printer.

February to August.—Tables and maps (in rough) prepared.

Weekly Weather Report, 1887.—Weekly numbers all issued promptly to date. Appendix I. Part 2 (Second Quarter) issued; Part 3 (Third Quarter) well advanced. The other Appendices are all well advanced, though slightly delayed by vacation time and changes in staff.

Daily Weather Report.—Issued promptly to date, with correction tables and monthly summary to July.

Daily United States Telegrams.—All plotted to date.

Checking of Storm Warnings issued since February 1887.—Done to date.

Checking of Daily (3.30 p.m. and 8.30 p.m.) *Forecasts.*—Done to date.

Issue of Hay Harvest Forecasts, 1887.—Completed. Checking of same will be put in hand shortly.

Owing to the death of Mr. Stevens, occurring as it did during the time that several of the staff were taking their summer vacation, there has been some little retardation of the work in this Branch. The arrangements to supply his place are now completed, and it is believed that all arrears will be rapidly overtaken.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

October 1, 1887.

Observatory Returns.—The daily, five-daily, and monthly means, and the vapour tension values for each hour, calculated for January, February, and March 1885; the Hourly Readings copied for the same period, and sent to printer; proof read and revised for nearly the whole of Part I., 1885; and Introduction to the part prepared and sent to press. The means for April 1885 are well advanced.

Quarterly Weather Report.—Proof of Part I., 1879, with the accompanying plates, revised and signed for press. Letterpress and plates completed for Part II. 1879; proofs corrected and the Part signed for press. Chart plates for Part III. completed and sent to printer, and those for Part IV. are now in hand.

Harmonic Analyser.—The barograms from four stations for 1877 have been passed through the analyser; and the results worked out and entered upon the usual sheets.

Miscellaneous.—Proofs of the report on the Krakatoa air-waves, and of the accompanying plates, have been read and revised. Sunshine cards for April, May, and June 1887 tabulated for Royal Meteorological Society. A good deal of time occupied in checking adjustment, &c. of sunshine recorders. An anemogram form prepared, &c. for Heligoland, and memoranda prepared on two or three matters, in addition to the usual routine work of the room. The usual summer vacation has been taken in the period covered by this report.

(Signed) R. H. CURTIS.

R. H. Scott, Esq., F.R.S.

EXAMINATION BRANCH.

October 1, 1887.

Examinations.

June to August 1885.—All stations: completed.
October to December 1886.—Kew *barograms* and *thermograms*: completed for the Annual Report.
June to August 1887.—Valencia work partially examined for the Registrar General of Ireland.
Weekly examination (on receipt) of curves and documents from all stations.

Reports, &c.

May to August 1885.—*Notes of Errors* to Aberdeen, Armagh (anemograms), Falmouth, Kew (anemograms) and Valencia, and reports thereon to Council.
Re Kew wet-bulb differences (T—S); new zero-line value required.
Re Falmouth anemograms; the difference in terms of beginning and ending.
Re Valencia barometer residuals.

Miscellaneous.

Completing "Code of Regulations" for press.
The moving and removing consequent upon the cleaning, &c. of room caused great delay, and the greater part of the annual vacation has been taken by the staff.

(Signed) T. E. ALLEN.

Submitted the following letter (Minutes, 1884, p. 25):—

(M. O. 1762.)

Emmanuel House, Cambridge,
August 16, 1887.

DEAR MR. SCOTT,

I AM sending by parcel post a bundle of papers on Hygrometry, which I hope will arrive in safety. One is an account of my endeavours to determine the limit of accuracy of the chemical method, and I think I have got it to well within 1 per cent. The question is, of course, mixed up with that very fundamental one for hygrometry, viz., whether the tabulated pressure of water vapour in vacuo can be regarded as the saturation pressure in air at the same temperature, when the air is saturated not in a glass vessel, as was the case with Regnault's direct experiment, but in a wet muslin cage. My experiments confirm Regnault's suspicion that the differences he observed were due to the glass, and not to the error in Dalton's Law. I have included in the same paper a discussion of Regnault's dew-point instrument by means of observations with air in a known state. I also treat of Dines's dew-point instrument, Alluard's and Bogen's. These are all the dew-point instruments included in my instructions.

The second paper is a sort of report on the present state of hygrometry, which I have gradually compiled in the course of my work. I found it was so difficult to estimate different observers' work in consequence of the various methods used as standards and so on, that I had finally to make a definite compilation of results. The result seems to me to be that the process of testing psychrometers by simultaneous observations with a standard in free air is exhausted, and yet the problem remains unsolved. The next step seems to be to arrange the experiment, so as to be able to vary the elements—pressure, temperature and humidity—at will, so as to consider each separately. There is some difficulty about this, but I think it may be got over.

I am very sorry to have been so long about this. The people I had to help me mostly gave up, finding the work tedious, and the growing work for the Laboratory and the College gradually took away all my term time and a good deal of my vacations. I have now given up demonstrating in the Laboratory and hope to come to a final end within a year or two. In the meantime I hope the Meteorological Office will be willing to print the report and the appendix.

Yours, &c.
(Signed) W. N. SHAW.

Mr. Scott was instructed to print Mr. Shaw's report as an appendix to the Quarterly Weather Report.

Read—A letter (No. 2158) from Mr. Bayard accompanying a copy of the hourly means of the seven observatories for 1880. (Minutes, 1886, p. 126).

Reported—That Dr. Paulsen, of the Danish Meteorological Office, had written (Letter 1793) to stop the extraction of data relating to Atlantic weather from the Office logs (Minutes, 1886, p. 134).

Reported—That on the 6th of August Mr. H. J. Stevens, who had been in a depressed condition of mind for some days, committed suicide (Letters 1704, 1777).

That on the 20th September Mr. H. J. Griffith had resigned his appointment as an unclassified clerk.

That in order to fill these vacancies two unclassified clerks had been appointed:—

A. E. Pycock, from September 19, at 18*s.* 6*d.* per week.
F. E. Dash, ,, October 17, ,, 10*s.* per week.

Reported—That the copies of the Fishery Barometer Manual (Minutes, p. 26) had come in. The Secretary was instructed to distribute them to the Fishery Barometer Stations, and to write to the Admiralty suggesting that a copy be sent to each Coast-guard Station (P.C. 2).

Submitted—The following Statement respecting the Records for May—September 1885, received from the Self-recording Observatories (see Minutes, 21st December 1868, and 20th November 1876, and 3rd January 1883):—

MAY 1885.	ABERDEEN.		ARMAGH.		FALMOUTH.		KEW.		VALENCIA.	
ANEMOGRAPH:—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Action of Instrument	Good.	Good.	Good.	†Indifft.	§Indifft.	§Indifft.	Good.	Good.	Good.	Good.
Records deficient:—										
Due to stoppage of clock	0	0	0	0	18 hrs.	18 hrs.	0	0	0	0
„ other causes	0	0	0	0	‡58 hrs. ‖ 3 hrs.	0 hrs. ‖4 hrs.	0	0	0	0
Number of errors discovered:—										
By general examination	0	0	0	0	0	0	0	0	0	7
Results of 40 Remeasurements:—										
Greatest difference	0·0	1·0	0·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·0	0·3	0·0	0·2	0·0	0·5	0·1	0·3	0·2	0·6
Residual difference (—Meteorological Office)	0·0	−0·1	0·0	0·0	0·0	+0·1	+0·1	0·0	0·0	0·0
Orientation verified	30th	—	—	—	9th	—	8th	—	6th	—
RAIN GAUGE:—										
Action of Instrument	*Good.		Good.		*Good.		‡Indifferent.		Good.	
Records deficient:—										
Due to stoppage of clock	0		0		0		0		0	
„ other causes	0		0		¶24 hrs.		0		0	
Number of errors discovered:—										
By general examination	1		7		1		1		1	

	ABERDEEN.	FALMOUTH.	KEW.	VALENCIA.
BAROGRAPH:—				
Action of Instrument	Good.	Good.	‖‖Bad.	Good.
Character of Photography	Do.	Do.	Good.	Do.
Records deficient:—				
Due to stoppage of clock	0	0	0	0
„ failure of light	0	0	11 hrs.	1 hr.
„ other causes	0	††49 hrs. ¶192 hrs.	0	0
Number of errors discovered:—				
In entry of standards	0	‡‡2	2	1
„ calculating residuals	1	0	0	0
„ applying „	1	0	1	0
By general examination	0	1	1	5
Results of 40 Remeasurements:—				
Greatest difference	·007	·006	·006	·009
Mean difference irrespective of sign	·002	·002	·002	·004
Residual difference (—Meteorological Office)	−·001	+·001	+·001	·000
Mean monthly difference between simultaneous Barograph and Standard Barometer readings	·002	·002	·003	·001

	ABERDEEN.		FALMOUTH.		KEW.		VALENCIA.	
THERMOGRAPH:—								
Action of Instrument	Good.		Good.		Good.		Good.	
Character of Photography	Do.		Do.		Do.		Do.	
Records deficient:—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Due to stoppage of clock	0	0	0	0	0	0	0	0
„ failure of light	0	0	0	0	0	0	0	0
„ imperfectly moistened bulbs	—	0	—	0	—	0	—	0
„ partially frozen bulbs	—	2 hrs.	—	0	—	0	—	0
„ other causes	0	0	¶193 hrs.	††3 hrs. ¶193 hrs.	0	0	0	0
Number of errors discovered:—								
In entry of standards	0	0	1	2	0	0	0	1
„ maxima and minima	0	—	1	—	1	—	4	—
By general examination	0	0	0	0	1	1	2	2
Results of 40 Remeasurements:—								
Greatest difference	0·2	0·2	—	0·2	0·3	0·2	0·3	0·3
Mean difference irrespective of sign	0·1	0·1	—	0·1	0·1	0·1	0·1	0·1
Residual difference (—Meteorological Office)	−0·1	0·0	—	0·0	0·0	−0·1	+0·1	+0·1
Mean monthly difference between simultaneous Thermograph and Standard Thermometer readings	0·2	0·2	0·1	0·1	0·2	0·2	0·2	0·2

* Traces faint. † Trace intermittent in low velocities. ‡ Imperfect action of pencil.
§ After re-tabulation at observatory. ‖ Adjusting pencil. ¶ Removing instrument to new observatory. †† Photographic imperfections.
‡‡ 25 standards rejected; thread of mercury in attached thermometer detached. ‖‖ Air-hole choked with dust.

JUNE 1885.	ABERDEEN.		ARMAGH.		FALMOUTH.		KEW.		VALENCIA.	
ANEMOGRAPH:—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Action of Instrument	Good.	Good.	Good.	†Indifft.	‡Indifft.	‡Indifft.	Good.	Good.	Good.	Good.
Records deficient:—										
Due to stoppage of clock	0	0	0	0	0	0	0	0	0	0
„ other causes	0	0	0	0	§18 hrs. ‖182 hrs.	§3 hrs. ‖182hrs.	0	0	0	0
Number of errors discovered:—										
By general examination	0	0	0	25	0	17	0	3	0	5
Results of 40 Remeasurements:—										
Greatest difference	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	0·0	2·0
Mean difference irrespective of sign	0·0	0·3	0·1	0·3	0·0	0·2	0·1	0·5	0·0	0·7
Residual difference (—Meteorological Office)	0·0	−0·1	−0·1	+0·1	0·0	0·0	+0·1	0·0	0·0	+0·1
Orientation verified	30th	—	—	—	—	—	1st	—	6th	—
RAIN GAUGE:—										
Action of Instrument	*Good.		Good.		*Good.		§Indifferent.		*Good.	
Records deficient:—										
Due to stoppage of clock	0		0		0		0		0	
„ other causes	0		0		0		0		0	
Number of errors discovered:—										
By general examination	0		0		2		1		0	

——	ABERDEEN.	FALMOUTH.	KEW.	VALENCIA.
BAROGRAPH:—				
Action of Instrument	Good.	**Indifferent.	¶¶Bad.	Good.
Character of Photography	Do.	Good.	Good.	Fair.
Records deficient:—				
Due to stoppage of clock	0	0	0	0
„ failure of light	0	0	6 hrs.	0
„ other causes	0	†† 3 hrs. ‡‡ 5 hrs. ‖‖ 32 hrs.	0	0
No. of errors discovered:—				
In entry of standards	0	3	12	0
„ calculating residuals	0	5	0	0
„ applying „	0	0	2	0
By general examination	0	1	3	7
Results of 40 Remeasurements:—				
Greatest difference	·008	·006	·008	·008
Mean difference irrespective of sign	·003	·002	·004	·004
Residual difference (—Meteorological Office)	·000	−·001	+·002	·000
Mean monthly difference between simultaneous Barograph and Standard Barometer readings	·002	·002	·003	·001

	ABERDEEN.		FALMOUTH.		KEW.		VALENCIA.	
THERMOGRAPH:—								
Action of Instrument	Good.		Good.		Good.		Good.	
Character of Photography	Do.		Do.		Do.		Fair.	
Records deficient:—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Due to stoppage of clock	0	0	0	0	0	0	0	0
„ failure of light	0	0	0	0	0	0	***0	***0
„ imperfectly moistened bulbs	—	4 hrs.	—	0	—	4 hrs.	—	0
„ partially frozen bulbs	—	0	—	0	—	0	—	0
„ other causes	0	0	††3 hrs.	††3 hrs.	§§1 hr.	0	0	0
Number of errors discovered:—								
In entry of standards	0	0	0	0	2	4	5	7
„ maxima and minima	1	—	2	—	4	—	4	—
By general examination	0	0	1	0	0	4	1	2
Results of 40 Remeasurements:—								
Greatest difference	0·2	0·2	0·3	0·3	0·2	0·2	0·3	0·3
Mean difference irrespective of sign	0·1	0·1	0·1	0·1	0·1	0·1	0·2	0·1
Residual difference (—Meteorological Office)	0·0	+0·1	−0·1	0·0	0·0	0·0	0·0	0·0
Mean monthly difference between simultaneous Thermograph and Standard Thermometer readings	0·2	0·2	0·2	0·1	0·2	0·2	0·3	0·2

* Traces faint.
§ Imperfect action of pencil.
†† Fitting regulator to meter.
¶¶ Air-hole choked with dust.
† Intermittent in low velocities.
‖ Instrument dismounted.
‡‡ Refitting light shutter.
§§ Water spilled on bulb.
‡ After re-tabulation at observatory.
** Bad action of light shutter.
‖‖ Clock stopped by shutter.
*** Zero lines very imperfect for want of light.

JULY 1885.	ABERDEEN.		ARMAGH.		FALMOUTH.		KEW.		VALENCIA.	
ANEMOGRAPH :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Action of Instrument	Good.	Good.	Good.	‡Indifft.	Good.[a]	Good.[a]	Good.	Good.	Good.	Good.
Records deficient :—										
Due to stoppage of clock	0	0	0	0	0	0	0	0	0	0
„ other causes	0	0	0	0	379 hrs.[b]	384hrs.[b]	0	0	0	0
Number of errors discovered :—										
By general examination	0	0	0	2	0	1	0	0	1	3
Results of 40 Remeasurements :—										
Greatest difference	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·1	0·4	0·1	0·2	0·1	0·4	0·1	0·5	0·1	0·3
Residual difference (—Meteorological Office)	0·0	+0·1	0·0	+0·1	+0·1	−0·1	−0·1	0·0	−0·1	0·0
Orientation verified	—	—	25th	—	16th	--	7th	—	4th	—

RAIN GAUGE :—				
Action of Instrument	*Good.	Good.	*Good.[c]	§Indifferent.	Good.
Records deficient :—					
Due to stoppage of clock	0	0	0	0	0
„ other causes	†4 hrs.	0	0	0	0
No. of errors discovered :—					
By general examination	0	0	1	0	1

——	ABERDEEN.	FALMOUTH.	KEW.	VALENCIA.
BAROGRAPH :—				
Action of Instrument	Good.	Good.	††Bad.	Good.
Character of Photography	Do.	Do.	Good.	Indifferent.
Records deficient :—				
Due to stoppage of clock	0	0	0	0
„ failure of light	0	0	0	0
„ other causes	‖1 hr.	¶1 hr.; ** 3 hrs.	‡‡1 hr.	0
Number of errors discovered :—				
In entry of standards	0	3	12	1
„ calculating residuals	0	0	2	0
„ applying	0	2	0	1
By general examination	0	0	0	2
Results of 40 Remeasurements :—				
Greatest difference	·009	·008	·008	·010
Mean difference irrespective of sign	·004	·003	·003	·003
Residual difference (—Meteorological Office)	+·001	·000	·000	·000
Mean monthly difference between simultaneous Barograph and Standard Barometer readings	·001	·002	·005	·001

	ABERDEEN.		FALMOUTH.		KEW.		VALENCIA.	
THERMOGRAPH :—								
Action of Instrument	Good.		Good.		Good.		Good.	
Character of Photography	Do.		Do.		Do.		Fair.	
Records deficient :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Due to stoppage of clock	0	0	0	0	1 hr.	1 hr.	0	0
„ failure of light	0	0	0	0	1 hr.	1 hr.	0	0
„ imperfectly moistened bulbs	—	6 hrs.	—	0	—	9 hrs.	—	0
„ partially frozen bulbs	—	0	—	0	—	0	—	0
„ other causes	0	0	§§ 6 hrs.; ‖‖ 15 hrs.	‖‖15 hrs.	0	0	0	0
Number of errors discovered :—								
In entry of standards	0	0	2	1	¶¶1	¶¶2	1	3
„ maxima and minima	0	—	0	—	6	—	1	—
By general examination	0	0	0	0	19	1	1	0
Results of 40 Remeasurements :—								
Greatest difference	0·2	0·2	0·2	0·3	0·2	0·3	0·4	0·2
Mean difference irrespective of sign	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1
Residual difference (—Meteorological Office)	0·0	+0·1	0·0	0·0	0·0	0·0	−0·1	−0·1
Mean monthly difference between simultaneous Thermograph and Standard Thermometer readings	0·2	0·2	0·2	0·1	0·2	0·2	0·2	0·2

* Trace faint. † Gauge choked by a leaf. ‡ Trace intermittent in low velocities. § Imperfect action of pencil.
‖ Curves changed too near the hour. ¶ Removing thermograph cylinder. ** Imperfect action of shutter.
†† Air-hole choked with dust. ‡‡ Fitting new meter. §§ Dry bulb thermometer broken.
‖‖ Mounting new thermometer. ¶¶ Standards entered very carelessly on curves. * Pricker bent, traces marking 10m. late.
[b] Instrument sent to Munro's for "re-adjustment of pencils." [c] Attachment of curves bad.

AUGUST 1885.	ABERDEEN.		ARMAGH.		FALMOUTH.		KEW.		VALENCIA.	
ANEMOGRAPH:—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Action of Instrument	Good.	Good.	Good.	Indifft.†	Good.[a]	Good.[a]	Good.	Good.	Good.	Good.
Records deficient:—										
Due to stoppage of clock	0	0	0	0	0	0	0	0	0	0
„ other causes	0	0	0	0	1 hr.¶	1 hr.¶	0	0	4 hrs.§	4 hrs.§
Number of errors discovered:—										
By general examination	0	0	6	3	0	5	0	1	1	4
Results of 40 Remeasurements:—										
Greatest difference	0·0	1·0	1·0	1·0	1·0	2·0	1·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·0	0·6	0·1	0·4	0·1	0·5	0·1	0·3	0·1	0·5
Residual difference (—Meteorological Office)	0·0	+0·1	+0·1	+0·1	0·0	0·0	0·0	−0·1	+0·1	+0·1
Orientation verified	31st	—	—	—	15th	—	8th	—	5th	—

RAIN GAUGE:—										
Action of Instrument	Good.*		Good.		Good.[c]*		Indifferent.‡		Good.	
Records deficient:—										
Due to stoppage of clock	0		0		0		0		0	
„ other causes	0		0		0		16 hrs.		0	
Number of errors discovered:—										
By general examination	0		0		0		0		0	

——	ABERDEEN.		FALMOUTH.		KEW.		VALENCIA.	
BAROGRAPH:—								
Action of Instrument	Good.		Good.		Bad.‖		Good.	
Character of Photography	Do.		Do.		Good.		Do.	
Records deficient:—								
Due to stoppage of clock	0		0		0		0	
„ failure of light	0		0		1 hr.		0	
„ other causes	0		0		2 hrs.¶		0	
Number of errors discovered:—								
In entry of standard	0		0		8		0	
„ calculating residuals	0		2		1		0	
„ applying „	0		1		2		0	
By general examination	0		0		0		0	
Results of 40 Remeasurements:—								
Greatest difference	·008		·007		·006		·007	
Mean difference irrespective of sign	·003		·003		·003		·003	
Residual difference (—Meteorological Office)	−·001		+·001		·000		−·001	
Mean monthly difference between simultaneous Barograph and Standard Barometer readings	·001		·002		·003		·002	

THERMOGRAPH:—										
Action of Instrument	Good.		Good.		Good.		Good.**			
Character of Photography	Do.		Do.		Do.		Fair.			
Records deficient:—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.		
Due to stoppage of clock	0	0	0	0	1 hr.	1 hr.	0	0		
„ failure of light	0	0	0	0	1 hr.	1 hr.	0	1 hr.		
„ imperfectly moistened bulbs	—	0	—	6 hrs.	—	1 hr.	—	2 hrs.		
„ partially frozen bulbs	—	0	—	0	—	0	—	0		
„ other causes	0	0	0	0	4 hrs.¶	4 hrs.¶	0	0		
Number of errors discovered:—										
In entry of standards	0	0	0	0	2	2	1	1		
„ maxima and minima	0	—	0	—	1	—	1	—		
By general examination	0	0	0	0	5	4	2	5		
Results of 40 Remeasurements:—										
Greatest difference	0·2	0·2	—[b]	0·3	0·2	0·2	0·3	0·3		
Mean difference irrespective of sign	0·1	0·1	—	0·1	0·1	0·1	0·1	0·1		
Residual difference (—Meteorological Office)	−0·1	+0·1	—	+0·1	0·0	0·0	−0·1	0·0		
Mean monthly difference between simultaneous Thermograph and Standard Thermometer readings	0·2	0·2	0·1	0·2	0·2	0·2	0·1	0·2		

* Traces faint. † Trace intermittent in low velocities. ‡ Imperfect action of pencil. § Omitted to lower pencils.
‖ Air-hole choked with dust. ¶ Cleaning instrument. ** Action of light shutter very indifferent.
[a] Pricker bent, traces marking 10 m. late. [b] Tabulated at the Meteorological Office. [c] Attachment of curves bad.

SEPTEMBER 1885.	ABERDEEN.		ARMAGH.		FALMOUTH.		KEW.		VALENCIA.	
ANEMOGRAPH :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Action of Instrument	Good.	Good.	Good.	‡Indiff.	Good.[a]	Good.[a]	Good.	Good.	Good.	Good.
Records deficient :—										
Due to stoppage of clock	0	0	49 hrs.	48 hrs.	0	0	0	0	0	0
„ other causes	*1 hr.	*2 hrs.	0	0	4 hrs.[c]	4 hrs.[c]	0	0	0	0
Number of errors discovered :—										
By general examination	0	0	0	0	0	3	0	1	0	2
Results of 40 re-measurements :—										
Greatest difference	1·0	1·0	1·0	1·0	1·0	2·0	1·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·1	0·4	0·1	0·3	0·0	0·5	0·0	0·2	0·0	0·7
Residual difference (—Meteorological Office)	0·0	0·0	+0·1	−0·1	0·0	0·0	0·0	0·0	0·0	−0·3
Orientation verified	15th	—	29th	—	—	—	10th	—	4th	—
RAIN GAUGE :—										
Action of Instrument	†Good.		Good.		†Good.[d]		§Indifferent.		Good.	
Records deficient :—										
Due to stoppage of clock	0		0		0		0		0	
„ other causes	0		0		0		‖5 hrs.		0	
Number of errors discovered :—										
By general examination	0		0		9		1		0	

——	ABERDEEN.		FALMOUTH.		KEW.		VALENCIA.	
BAROGRAPH :—								
Action of Instrument	Good.		Good.		¶Bad.		Good.	
Character of Photography	Do.		Do.		Good.		Do.	
Records deficient :—								
Due to stoppage of clock	0		0		0		0	
„ failure of light	0		0		0		0	
„ other causes	*2 hrs.		0		**55 hrs.		0	
Number of errors discovered								
In entry of standards	0		2		2		0	
„ calculating residuals	0		2		2		0	
„ applying „	1		6		2		0	
By general examination	0		1		0		0	
Results of 40 re-measurements :—								
Greatest difference	·006		·007		·006		·037	
Mean difference irrespective of sign	·002		·004		·003		·002	
Residual difference (—Meteorological Office)	·000		−·001		−·001		−·001	
Mean monthly difference between simultaneous Barograph and Standard Barometer readings	·002		·002		·003		·002	
THERMOGRAPH :—								
Action of Instrument	Good.		Good.		Good.		Good.	
Character of Photography	Do.		Do.		Do.		Do.	
Records deficient :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Due to stoppage of clock	0	0	0	0	0	0	0	0
„ failure of light	0	0	0	0	0	0	0	0
„ imperfectly moistened bulbs	—	0	—	0	—	1 hr.	—	0
„ partially frozen bulbs	—	0	—	0	—	0	—	0
„ other causes	*2 hrs.	*2 hrs.	0	0	0	0	0	0
Number of errors discovered :—								
In entry of standards	0	0	6	7	0	1	0	1
„ maxima and minima	0	—	0	—	0	—	0	—
By general examination	0	0	2	6	2	2	0	0
Results of 40 re-measurements :—								
Greatest difference	0·2	0·2	—[b]	0·3	0·2	0·2	0·2	0·2
Mean difference irrespective of sign	0·0	0·1	—	0·1	0·1	0·1	0·1	0·1
Residual difference (—Meteorological Office)	0·0	+0·1	—	+0·1	−0·1	0·0	−0·1	0·0
Mean monthly difference between simultaneous Thermograph and Standard Thermometer readings	0·1	0·2	0·1	0·2	0·1	0·2	0·1	0·2

* Instrument under examination. † Trace faint. ‡ Trace intermittent in low velocities. § Imperfect action of pencil.
‖ Instrument interfered with. ¶ Air-hole choked with dust. ** Photographic imperfections.
[a] Pricker bent, trace marking 10m. late. [b] Tabulated at the Meteorological Office. [c] Omitted to lower pencils.
[d] Attachment of curves bad.

Submitted—The following statement of accounts for the six months ending 30th September 1887 :—

Income.	£ s. d.	£ s. d.	Expenditure.	£ s. d.	£ s. d.
Balance from year 1886–87	- -	2,022 15 7	Administration :		
Proportion of vote for six months - -	- -	7,650 0 0	Payment of Council -	500 0 0	
Repayment of expenses charged under—			Secretary - -	400 0 0	
(1.) Incidental expenses - -	6 15 8		Salaries and wages -	400 13 6	
(2.) Special researches	7 19 4		Rent, fuel, and lighting -	366 2 1	
(3.) Observatories -	1 4 8		Furniture and fittings -	*20 0 0	
		15 19 8	Incidental and contingent expenses -	164 0 4	
			Pensions - -	21 8 2	
					1,872 4 1
Supply of Weather Information :			Special Researches -	- - -	378 9 11
D.W. Charts and Forecasts - -	141 3 7		Land Meteorology :		
6 p.m. Charts -	12 10 0		Observatories and stations - -	866 19 2	
Information for Press Agencies, &c. -	67 13 3		Discussion and reduction of observations -	646 11 6	
Telegrams - -	66 1 8				1,513 10 8
		287 8 6	Weather Information and Forecasts :		
Sale of Instruments, &c. :			Telegraphic reports and storm warnings -	1,309 15 9	
Royal Navy account -	0 5 0		Preparation and issue of reports and forecasts - -	839 8 7	
Mercantile Marine account - -	12 16 3				2,149 4 4
		13 1 3	Inspections :		
Commission charged on work done for Colonies, &c. - -	- -	4 17 11	Salaries and travelling -	- - -	*273 11 8
			Ocean Meteorology :		
			Discussion and reduction of observations -	948 13 0	
			Expenses incidental to the supply of instruments :		
			Proportion for care and issue of instruments -	100 0 0	
			Royal Navy -	115 1 10	
			Mercantile Marine-	116 3 4	
			Distant island and coast stations -	23 4 8	
					1,303 2 10
			Balance - - -	- - -	2,503 19 5
		£9,994 2 11			£9,994 2 11

Liabilities.	£ s. d.	Assets.	£ s. d.
To Council - - - -	500 0 0	By H.M. Exchequer - - -	650 0 0
,, contracts or work uncompleted -	164 1 8	,, cash at Bank - - - -	2,683 7 0
, Post Office (estimated) - -	220 0 0	,, ,, at Office - - - -	82 5 8
,, sundry creditors - - -	274 8 1	,, ,, at Valencia - - -	50 0 0
,, balance - - - -	2,503 19 5	,, sundry debtors - - -	196 16 6
	£3,662 9 2		£3,662 9 2

* Some expenses under this head not yet brought to account.

Reported—That the following cheques had been drawn:—

For July:—

1887.		£	s.	d.
July 2nd.	J. S. Harding, jun., for payment of weekly salaries -	15	11	6
„ 9th.	„ „ -	15	11	6
„ „	E. Mascart, French and American telegrams - -	*13	7	11
„ 16th.	J. S. Harding, jun., for payment of weekly salaries -	15	11	6
„ 21st.	G. A. Gillett, wood, oil, &c. - - - -	2	9	4
„ „	Gas Light and Coke Company, gas - - -	4	2	3
„ „	E. Higgs, Office repairs - - - - -	5	11	0
„ „	A. Shepherd, engraving - - - - -	3	7	0
„ „	Wightman & Co., printing and wrappers - -	9	11	10
„ „	A. W. Moore, postages - - - - -	3	12	10
„ „	Ross & McKenzie, erection of instruments at Stornoway	3	10	9
„ „	Negretti & Zambra, instruments - - -	93	4	9
„ „	A. Buchan, travelling expenses - - - -	5	16	6
„ 23rd.	J. S. Harding, jun., for payment of weekly salaries -	15	11	6
„ 30th.	„ „ -	15	11	6
„ „	R. H. Scott, Secretary - - - - -	66	13	4
„ „	J. S. Harding - } Office salaries - - -	27	15	6
„ „	T. D. Bell - - }	15	16	8
„ „	J. Sheerman, salary, harmonic analysis - - -	10	16	8
„ „	J. E. Cullum, salary, Valencia observatory - -	18	15	0
„ „	R. H. Curtis - - -	22	18	4
„ „	J. A. Curtis - - -	18	6	8
„ „	T. E. Allen - - -	16	13	4
„ „	C. H. Thompson - - } Salaries (discussion, &c. of observations).	12	10	0
„ „	S. Call - - -	11	13	4
„ „	R. G. Canham - -	7	10	0
„ „	A. H. Bell - - -	7	10	0
„ „	F. Gaster - - -	25	15	7
„ „	F. J. Brodie - - -	18	5	7
„ „	G. G. Francis - -	17	16	3
„ „	A. J. Rigby - - - } Salaries (preparation, &c. of Weather Reports).	17	6	10
„ „	R. Sargeant - - -	12	3	9
„ „	A. R. Simpkins - -	10	6	3
„ „	H. J. Stevens - - -	9	3	4
„ „	C. W. Heinemann - -	5	0	0
„ „	Capt. H. Toynbee - -	33	6	8
„ „	Nav.-Lieut. C. W. Baillie, R.N.	22	18	4
„ „	R. Strachan - - -	27	15	6
„ „	C. Harding - - - Salaries (discussion, &c.	22	18	4
„ „	H. Harries - - - } of observations, and	15	0	0
„ „	W. Allingham - - - care of instruments).	15	0	0
„ „	W. G. James - - -	11	5	0
„ „	F. T. Bullen - - -	9	3	4
„ „	R. F. Wallace - -	8	15	0
„ „	F. Gaster, for payment of allowances for late evening and Sunday attendance - - - - -	18	7	6
„ „	C. Harding, for payment of accounts for extraction of observations for Dr. Paulsen - - - -	24	19	8
„ „	J. S. Harding, jun., petty cash - - - -	50	0	0
„ „	J. H. Woodstock, packing cases - - -	3	9	0
„ „	R. Jenkin, thermometer screens - - -	10	0	0
„ „	R. H. Scott, travelling expenses - - -	30	0	0
		£878	6	5

* Paid by draft on foreign banker.

			£	s.	d.
For August:—					
Aug. 6th.	J. S. Harding, for payment of weekly salaries		15	11	6
„ 9th.	E. Mascart, telegrams		12	2	7
„ 10th.	London and North-Western Railway Company, carriage of parcels		1	14	8
„ „	T. De La Rue & Co., sunshine cards		4	3	0
„ „	Postmaster General, telegrams		95	11	8
„ „	Kew Committee, verification of instruments		42	19	0
„ 13th.	J. S. Harding, for payment of weekly salaries		15	11	6
„ 20th.	„ „		15	11	6
„ 27th.	„ „		15	11	6
„ 31st.	R. H. Scott, Secretary		66	13	4
„ „	J. S. Harding } Office salaries		27	15	6
„ „	T. D. Bell } Office salaries		15	16	8
„ „	J. Sheerman, salary (harmonic analysis)		10	16	8
„ „	J. E. Cullum, salary (Valencia Observatory)		18	15	0
„ „	R. H. Curtis } Salaries (discussion, &c. of observations).		22	18	4
„ „	J. A. Curtis } Salaries (discussion, &c. of observations).		18	6	8
„ „	T. E. Allen } Salaries (discussion, &c. of observations).		16	13	4
„ „	C. H. Thompson } Salaries (discussion, &c. of observations).		12	10	0
„ „	S. Call } Salaries (discussion, &c. of observations).		11	13	4
„ „	R. G. Canham } Salaries (discussion, &c. of observations).		7	10	0
„ „	A. H. Bell } Salaries (discussion, &c. of observations).		7	10	0
„ „	F. Gaster } Salaries (preparation, &c. of Weather Reports).		25	15	7
„ „	F. J. Brodie } Salaries (preparation, &c. of Weather Reports).		18	5	7
„ „	G. G. Francis } Salaries (preparation, &c. of Weather Reports).		17	16	3
„ „	A. J. Rigby } Salaries (preparation, &c. of Weather Reports).		17	6	10
„ „	R. Sargeant } Salaries (preparation, &c. of Weather Reports).		12	3	9
„ „	A. R. Simpkins } Salaries (preparation, &c. of Weather Reports).		10	6	3
„ „	Mrs. Stevens } Salaries (preparation, &c. of Weather Reports).		9	3	4
„ „	C. W. Heinemann } Salaries (preparation, &c. of Weather Reports).		5	0	0
„ „	Capt. H. Toynbee } Salaries (discussion, &c. of observations and care of instruments).		33	6	8
„ „	Nav.-Lieut. C. W. Baillie, R.N. } Salaries (discussion, &c. of observations and care of instruments).		22	18	4
„ „	R. Strachan } Salaries (discussion, &c. of observations and care of instruments).		27	15	6
„ „	C. Harding } Salaries (discussion, &c. of observations and care of instruments).		22	18	4
„ „	H. Harries } Salaries (discussion, &c. of observations and care of instruments).		15	0	0
„ „	W. Allingham } Salaries (discussion, &c. of observations and care of instruments).		15	0	0
„ „	W. G. James } Salaries (discussion, &c. of observations and care of instruments).		11	5	0
„ „	F. T. Bullen } Salaries (discussion, &c. of observations and care of instruments).		9	3	4
„ „	R. F. Wallace } Salaries (discussion, &c. of observations and care of instruments).		8	15	0
„ „	J. S. Harding, jun., petty cash		50	0	0
„ „	African Steam Ship Company, conveyance of instruments to West Coast of Africa		2	10	9
„ „	L. P. Casella, instruments		9	9	6
„ „	F. Gaster, for payment of allowances for late evening and Sunday attendance		14	19	4
„ „	J. H. Woodstock, packing cases		2	14	6
„ „	R. H. Scott, travelling expenses		20	0	0
„ „	C. Harding, for payment of accounts for extraction of observations for Dr. Paulsen		27	10	5
„ „	Bank of England, sale of Stationery Office forms		4	3	7
			£869	3	7

For September:—

			£	s.	d.
Sept. 3rd.	J. S. Harding, junr., for payment of weekly salaries		15	11	6
„ 9th.	R. Strachan „ „		15	11	6
„ 16th.	„ „ „		15	11	6
„ 23rd.	„ „ „		16	10	0
	Carried forward		£63	4	6

		£	s.	d.	£	s.	d.
1887.	Brought forward -	-		-	63	4	6
Sept. 28th.	Deutsche Seewarte, telegrams - - -	-		-	*17	18	0
„ „	E. Mascart, Paris, French and American telegrams	-		-	*12	17	9
„ 30th.	R. H. Scott, Secretary - - - -	-		-	66	13	4
„ „	J. S. Harding, jun. - - } Office salaries -	-		-	27	15	6
„ „	T. D. Bell - - - }	-		-	15	16	8
„ „	J. Sheerman, salary (harmonic analysis) -	-		-	10	16	8
„ „	J. E. Cullum, salary (Valencia Observatory)	-		-	18	15	0
„ „	R. H. Curtis - - - }				22	18	4
„ „	J. A. Curtis - - -				18	6	8
„ „	T. E. Allen - - -				16	13	4
„ „	C. H. Thompson - - } Salaries (discussion, &c.				12	10	0
„ „	S. Call - - - of observations).				11	13	4
„ „	R. G. Canham - -				7	10	0
„ „	A. H. Bell - - - }				7	10	0
„ „	F. Gaster - - - }				25	15	7
„ „	F. J. Brodie - -				18	5	7
„ „	G. G. Francis - - Salaries (preparation,				17	16	3
„ „	A. J. Rigby - - - } &c. of Weather				17	6	10
„ „	R. Sargeant - - - Reports).				12	3	9
„ „	A. R. Simpkins - -				10	6	3
„ „	C. W. Heinemann - - }				5	0	0
„ „	Capt. H. Toynbee - - }				33	6	8
„ „	Nav.-Lieut. C. W. Baillie, R.N.				22	18	4
„ „	R. Strachan - - - Salaries (discussion,				27	15	6
„ „	C. Harding - - - &c. of observations,				22	18	4
„ „	H. Harries - - - } and care of instru-				15	0	0
„ „	W. Allingham - - ments).				15	0	0
„ „	W. G. James - -				11	5	0
„ „	F. T. Bullen - -				9	3	4
„ „	R. F. Wallace - - }				8	15	0
„ „	G. J. Mayhew, rent - - -	158	15	0			
„ „	Pall Mall Coal Co., coals - -	15	0	0			
					173	15	0
„ „	London and North-Western Railway Co., carriage of parcels - - - -	-		-	3	11	7
„ „	J. S. Harding, senr., pension (Minutes, 1882, p. 43)	-		-	10	14	1
„ „	H. Williams, care of bridled anemometer	2	12	3			
„ „	„ care of Robinson's anemometer	2	11	3			
					5	3	6
„ „	C. Niven, Aberdeen Observatory - -	68	2	4			
„ „	J. L. E. Dreyer, Armagh Observatory -	12	10	0			
„ „	W. L. Fox, Falmouth „ -	61	19	6			
„ „	Fleetwood Improvement Commissioners, care of anemometer - - -	2	11	6			
„ „	R. Grant, Glasgow observatory - -	18	3	6			
„ „	Kew Committee, allowance for quarter -	100	0	0			
„ „	W. Harrison, care of North Shields anemometer - - - -	2	11	0			
„ „	W. I. Fortescue, care of Orkney anemometer - - - - -	2	10	0			
„ „	S. J. Perry, Stonyhurst observatory -	13	14	3			
„ „	J. E. Cullum, Valencia observatory -	48	10	6			
					330	12	7
„ „	G. T. Watson, care of Yarmouth anemometer - - -	3	18	0			
„ „	„ Meteorological reports -	4	3	0			
					8	1	0
	Carried forward - -				£1,135	13	3

* Paid by draft on a foreign banker.

1887.		£	s.	d.	£	s.	d.
	Brought forward -	-		-	1,135	13	3
Sept. 30th	H. Todd, Cambridge - - -	4	11	0			
,, ,,	H. Mohn, Christiania - - -	5	10	0			
,, ,,	P. Curnow, Dungeness - - -	4	11	4			
,, ,,	W. Brand, Dunrossness - - -	3	18	10			
,, ,,	W. H. Bunce, Hawes Junction - -	1	19	3			
,, ,,	S. Richards, Holyhead - - -	4	0	6			
,, ,,	G. G. Appleton, Hurst Castle - -	3	18	10			
,, ,,	J. Fisher, Jersey - - - -	4	8	6			
,, ,,	F. Gaster, London - - - -	3	18	0			
,, ,,	W. Berridge, Loughborough - -	3	5	5			
,, ,,	Lloyds', for Malin Head - - -	3	5	0			
,, ,,	K. Kerr, Mullaghmore - - -	5	5	0			
,, ,,	A. Penny, Nairn - - - -	4	5	0			
,, ,,	W. Wickham, Oxford - - -	3	11	6			
,, ,,	O. Boeddicker, Parsonstown - -	3	5	0			
,, ,,	W. Hewith, Prawle Point - - -	3	5	0			
,, ,,	S. Blake, St. Ann's Head - - -	3	12	0			
,, ,,	J. B. Smith, Spurn Head - - -	3	5	5			
,, ,,	J. Sinclair, Wick - - - -	3	5	0			
,, ,,	F. Guy, York - - - -	3	18	0			
					76	18	7
,, ,,	W. Thomas, Meteorological observations -	6	2	10			
,, ,,	,, care of anemometer - -	1	16	6			
					7	19	4
,, ,,	W. C. Ley, salary (six months) - -			-	75	0	0
,, ,,	Wightman & Co., printing - - -	1	6	6			
,, ,,	,, book-post wrappers, &c. -	7	5	6			
					8	12	0
,, ,,	R. W. Munro, anemometer for Dublin -	41	16	11			
,, ,,	,, ,, Heligoland -	41	14	6			
					83	11	5
,, ,,	African S. S. Co., freight - - -			-	1	11	6
,, ,,	F. Gaster, for payment of accounts for late evening and Sunday attendance - - -			-	15	18	11
,, ,,	J. S. Harding, jun., petty cash - -			-	40	0	0
,, ,,	H.M. Postmaster General, telegrams -	173	2	11			
,, ,,	,, wire at Valencia	20	15	0			
					193	17	11
,, ,,	J. R. Jones, Aberdeen agent - -	3	2	0			
,, ,,	J. Fowler, Cardiff agent - - -	3	6	0			
,, ,,	J. Gill, Liverpool agent - - -	14	8	4			
,, ,,	C. H. Permain, Southampton agent -	2	13	5			
					23	9	9
					£ 1,662	12	8

116, *Victoria Street, November* 2, 1887.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN. | PROFESSOR STOKES.
MR. GALTON. | MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (October 21) were read and confirmed.

Mr. Buchan was in attendance by invitation, and conversed with the Council for some time.

Read—A memorandum from Captain Toynbee reporting that since the last meeting four logs had been received, three of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. D. Gray -	S.S. "Eclipse"	April 20—Aug. 20, 1887.	Greenland, whaling -	1886, p. 64.
Capt. A. McLean -	S.S. "Concordia."	May 1—Oct. 18, 1887.	Glasgow and Montreal (five voyages).	1887, p. 16.
Com. W. U. Moore, R.N. Lieut. A. Balfour, R.N.	H.M.S. "Rambler."	May 1—Sept. 1, 1887.	Surveying in China Sea	1887, p. 37.

Mr. Scott was instructed to convey the best thanks of the Council to the above observers.

Submitted the following :—

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the last Meeting of the Council, naming the Day and Hours of Issue, the Coasts warned, the Signal hoisted, the Gales experienced (with approximate time of their occurrence), and the Result, as to the Character of the Warning.

(1.) WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result.† (Character of Warning.)
1887.				
Oct. 22nd, 7.20 p.m. -	Ireland, E. (Belfast only).	South cone	Strong Nly. winds, early on 24th -	B
" " -	Scotland, E. (from Aberdeen northwards).	"	" " " -	B
" " -	" W.* -	"	" " " -	B
" " -	England, N.W. (northern part).	"	Neither gales nor strong winds - (These strong winds blew mainly in the rear of the secondary disturbances which gave rise to the warnings, so that the north cone would have been better than the south.)	C
Oct. 25th, 7.15 p.m. -	Scotland, E. (extreme north only).	South cone	Strong S.Wly. winds on 26th -	B
Oct. 26th, 9.45 a.m. -	Ireland, S. -	"	Sly. gales, afternoon and evening of 26th.	A
" " -	" E.* -	"	Sly. gales, evening of 26th -	A

* Information insufficient to give very reliable results for these coasts.
† A = complete success (*i.e.* justified by gales of force 8 or more).
B = partial success (" " winds of forces 6 or 7).
C = failure (" not justified by either gales or strong winds).

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any) and approximate Time of Occurrence.	Result.† (Character of Warning.)
1887.				
Oct. 26th, 9.45 a.m. -	Scotland, W. -	South cone	Strong Sly. gales, night of 26th -	A
„ „ -	England, N.W. -	„	Fresh Sly. gales, night of 26th–27th	A
„ „ -	„ W. -	„	„ „ „	A
„ 10.50 a.m. -	Scotland, E. (excepting extreme north).	„	Strong Sly. winds and moderate gales, night of 26th.	B
„ 11.20 a.m. -	England, S.W. -	„	Moderate S.Wly. gales, on 27th -	B
Oct. 28th, 7.20 p.m. -	Ireland, S. -	South cone	Neither gales nor strong winds -	C
„ „ -	„ E. -	„	„ „ „ -	C
„ „ -	England, N.W. -	„	Strong S.Wly. winds, early on 29th	B
„ „ -	„ W. -	„	Neither gales nor strong winds -	C
„ „ -	„ S.W. -	„	Moderate S.Wly. gale, on night of 28th.	B
„ „ -	„ S. -	„	Neither gales nor strong winds -	C
„ „ -	„ (mouth of Thames).	„	„ „ „ -	C
			(A brisk and increasing reduction of pressure, a fresh and backing S.Wly. wind, and an "ugly" appearance were reported at Valencia at 6 p.m. 28th, and it is difficult to see how the forecaster could avoid warning under the conditions then prevailing.)	
Oct. 29th, 2.30 p.m. -	England, S.W. -	South cone	Wly. and Nly. gales, severe in places night of 29th.	A
„ „ -	„ S. -	„	Strong Wly. gales, early on 30th -	A
„ „ -	„ (mouth of Thames).	„	„ S.Wly. and Wly. gales on 30th.	A
Oct. 31st, 3.30 p.m. -	Ireland, S. - -	South cone	Strong Sly. gales, night of 31st, N.Wly. gales early on 1st.	A
„ „ -	„ E.* (excepting Belfast.)	„	Sly. gales, early on Nov. 1st -	A
„ „ -	England, N.W. (Bangor only.)	„	Strong S.Ely. gales, on Nov. 1st -	A
„ „ -	„ W. -	„	"Whole" gale from S., night of 31st and on Nov. 1st.	A
„ 3.40 p.m. -	„ S.W.‡ -	„	„ „ „ -	A
„ 5.30 p.m. -	Ireland, E. (Belfast only.)	„	S.Ely. and Sly. gales early on 1st -	A
„ „ -	England, N.W. (excepting Bangor).	„	Strong S.Ely. gales on Nov. 1st -	A
„ 7 p.m. -	Scotland, E. -	„	Whole gales from Swd. on Nov. 1st	A
„ „ -	„ W. -	„	S.Ely. gales early on Nov. 1st -	A
„ „ -	England, S.E. -	„	S.Ely. gales on Nov. 1st - -	A
„ „ -	„ E. -	„	Sly. gales on Nov. 1st - -	A
„ 7.10 p.m. -	„ S.‡ -	„	Whole gales from S., morning of Nov. 1st.	A
„ „ -	„ (mouth of Thames.)	„	S.Ely. gales, on morning of Nov. 1st	A

(2.) There have been no gales experienced without being warned for.

(Signed) FREDC. GASTER.

Telegraphic Branch,
2nd November 1887.

Submitted—The following reports of work during October 1887:—

MARINE ROOM.

November 1, 1887.

Examined 14 new logs and 3 lighthouse registers.

North Atlantic Weather Charts.

Charts prepared and forwarded to the lithographer to July 20, 1883. Proofs of lithographed charts received and passed for press to May 24, completing the series for Part III. The remainder of the period in course of reduction and preparation for publication. Progress has been made in the preparation of the additional charts for September 1–3.

General.

Discussion of the cyclones in the Gulf of Aden and neighbouring seas in May and June 1885. Most of the data relating to the early days of June have been charted. Since the date of the last report observations have been sent in from 20 ships, making a total of 214 ships from which observations have been received.

Discussion of Admiralty data for the Red Sea for the month of January.

Supplying the United States Hydrographic Office with a copy of the information received bearing upon the West India hurricanes of August and September 1887.

Copying observations from a rough book into log 6,905.

Indexing data in ocean 10-degree squares.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.
October 1877.

Quarterly Weather Report, 1879.—Tables for third part, containing means of pressure, temperature, wind, &c. for all telegraphic reporting stations. Completed and handed in.

Monthly Weather Report :—

January to August.—As at time of last report.

September.—Tables and rough charts prepared.

Weekly Weather Report :—

Issued promptly to date.

Appendix I., Part III. (third Quarterly Summary) sent "for press."

Other Appendices being proceeded with steadily.

Daily Weather Report.—Issued promptly to date. Corrections, Tables, and Monthly Summary for August issued. Those for September are nearly ready.

Checking of Storm Warnings Issued since last meeting.—Done to date. Return submitted herewith.

Checking of Daily (3.30 *p.m. and* 8.30 *p.m.*) *Forecasts.*—Done to date.

Checking of Hay Harvest Forecasts, 1887.—Put in hand.

Preparation of Report on Prevalence of Fog at Telegraphic Reporting Stations during 10 years, 1876 to 1885.—Commenced.

Plotting of information received in Daily Telegrams from the United States (viâ Paris).—Done to date. Reports of icebergs, wrecks, and derelicts sent to Lloyd's, whenever received.

Much has been done in overtaking the arrears (referred to in last report), which are now nearly done with.

(Signed) FREDC. GASTER.

Telegraphic Branch, 2nd November 1887.

PANTAGRAPH ROOM.

November 1, 1887.

Observatory Returns.—Revise of proof of Part I., Hourly Readings 1885, completed, and signed for press. The means for April 1885 completed and the hourly values copied and sent to printer. The calculation of the various means required for the Annual Report of the Kew Observatory is being pushed forward.

Quarterly Weather Report.—The tables for Part III., 1879, are completed, but the part has not been otherwise advanced.

Harmonic Analyser.—The analysis of the barograms for 1877 has been completed. The results are now being worked out and tabulated.

Miscellaneous.—Proof of portion of Krakatoa report read. The adjustment of Sunshine Recorders has occupied some time. The preparation of the means for the Kew Report has interfered very much with the ordinary work of the room.

(Signed) R. H. CURTIS.

R. H. Scott, Esq., F.R.S.

EXAMINATION BRANCH.

November 1, 1887.

Examinations.

September 1885.—All Stations. Completed.

January—September 1887.—Kew *barograms* and *thermograms*. Completed for the Annual Report.

September 1877.—Valentia work partially examined for the Registrar General of Ireland.

Weekly examination (on receipt) of curves and documents from all stations.

Reports, &c.

September 1885.—*Notes of Errors* to Aberdeen, Armagh (*anemogram*), Falmouth, Kew (*anemograms*), and Valencia, and report thereon to Council.

Miscellaneous.

Revising proof of the Reports to Council, May—September 1885.

(Signed) T. E. ALLEN.

Submitted—The following Report on the forecasts for October 1887.

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

OCTOBER.

3.30 P.M.

DISTRICTS.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
SCOTLAND, N.	a	46	69	58	79
,,	b	31	12	21	
,,	c	23	11	17	
,,	d	0	8	4	
SCOTLAND, E.	a	50	50	50	87
,,	b	35	38	37	
,,	c	12	8	10	
,,	d	3	4	3	
ENGLAND, N.E.	a	54	60	57	90
,,	b	38	28	33	
,,	c	8	8	8	
,,	d	0	4	2	
ENGLAND, E.	a	42	76	59	92
,,	b	50	16	33	
,,	c	8	8	8	
,,	d	0	0	0	
MIDLAND COS.	a	52	69	61	92
,,	b	40	23	31	
,,	c	8	8	8	
,,	d	0	0	0	
ENGLAND, S.	a	69	76	73	94
,,	b	27	16	21	
,,	c	4	8	6	
,,	d	0	0	0	
SCOTLAND, W.	a	44	32	38	82
,,	b	32	56	44	
,,	c	20	0	10	
,,	d	4	12	8	
ENGLAND, N.W.	a	60	60	60	92
,,	b	28	36	32	
,,	c	8	4	6	
,,	d	4	0	2	
ENGLAND, S.W.	a	56	64	60	92
,,	b	32	32	32	
,,	c	12	4	8	
,,	d	0	0	0	
IRELAND, N.	a	32	44	38	78
,,	b	40	40	40	
,,	c	16	8	12	
,,	d	12	8	10	
IRELAND, S.	a	64	52	58	84
,,	b	16	36	26	
,,	c	16	8	12	
,,	d	4	4	4	

8.30 P.M.

DISTRICTS.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
SCOTLAND, N.	a	58	68	63	89
,,	b	29	23	26	
,,	c	7	3	5	
,,	d	6	6	6	
SCOTLAND, E.	a	65	74	70	91
,,	b	26	16	21	
,,	c	6	3	4	
,,	d	3	7	5	
ENGLAND, N.E.	a	61	68	65	92
,,	b	32	23	27	
,,	c	7	3	5	
,,	d	0	6	3	
ENGLAND, E.	a	50	65	58	96
,,	b	50	26	38	
,,	c	0	9	4	
,,	d	0	0	0	
MIDLAND COS.	a	50	61	56	89
,,	b	43	23	33	
,,	c	7	13	10	
,,	d	0	3	1	
ENGLAND, S.	a	64	68	66	92
,,	b	33	19	26	
,,	c	3	10	7	
,,	d	0	3	1	
SCOTLAND, W.	a	35	29	32	76
,,	b	39	49	44	
,,	c	23	3	13	
,,	d	3	19	11	
ENGLAND, N.W.	a	55	65	60	89
,,	b	32	26	29	
,,	c	10	3	7	
,,	d	3	6	4	
ENGLAND, S.W.	a	55	58	57	97
,,	b	39	42	40	
,,	c	6	0	3	
,,	d	0	0	0	
IRELAND, N.	a	27	39	33	79
,,	b	47	45	46	
,,	c	20	10	15	
,,	d	6	6	6	
IRELAND, S.	a	50	42	46	85
,,	b	33	45	39	
,,	c	17	0	9	
,,	d	0	13	6	

SUMMARY.

BRITISH ISLES	a	52	59	56	87
,,	b	33	30	31	
,,	c	12	7	10	
,,	d	3	4	3	
BRITISH ISLES	a	52	58	55	89
,,	b	37	31	34	
,,	c	9	5	7	
,,	d	2	6	4	

Submitted—The following memorandum :—

The following instruments are required for stock :—

"A" ACCOUNT.

	£	s.	d.
50 maximum thermometers - - - } 50 minimum „ estimated cost - }	62	10	0

"B.T." ACCOUNT.

100 hydrometers, estimated cost -	22	10	0
100 thermometers „ - -	25	0	0
25 coast barometers „ - -	132	10	0

"M.O." ACCOUNT.

24 storm signal cones, estimated cost - -	14	14	0
6 rain-gauges „ - -	12	0	0
1 Stevenson's screen „ - -	2	2	0

(Signed) R. STRACHAN,
November 2, 1887.

—Approved.

Reported—That the following cheques had been drawn for the month of October :—

1887.			£	s.	d.
Oct.	1st.	J. S. Harding, jun., for payment of weekly salaries -	15	10	0
„	8th.	„ „ „ -	15	10	0
„	14th.	R. H. Scott, travelling expenses - - - -	21	7	0
„	„	R. H. Curtis, „ - - - -	7	15	0
„	15th.	J. S. Harding, jun., for payment of weekly salaries -	15	10	0
„	18th.	Paris M. O. telegrams* - - - - -	4	3	2
„	22nd.	T. De la Rue & Co., sunshine cards - - -	8	15	0
„	„	J. Forbes, Meteorological observations - - -	8	3	8
„	„	Negretti & Zambra, instruments - - - -	63	2	0
„	„	R. Rivière & Sons, presentation labels - - -	1	13	0
„	„	D. McGregor & Co., Glasgow agents - - -	18	2	6
„	„	J. S. Harding, jun., for payment of weekly salaries -	16	0	0
„	„	Paris M. O. telegrams* - - - - -	8	15	7
„	29th.	J. S. Harding, jun., for payment of weekly salaries -	16	0	0
„	„	Deutsche Seewarte telegrams* - - - -	17	18	11
„	31st.	R. H. Scott, Secretary - - - - -	66	13	4
„	„	J. S. Harding, jun. } Office salaries - -	27	15	6
„	„	T. D. Bell - } Office salaries - -	15	16	8
„	„	J. Sheerman, salary (harmonic analysis) - -	10	16	8
„	„	J. E. Cullum „ (Valencia Observatory) - -	18	15	0
„	„	R. H. Curtis - - }	22	18	4
„	„	J. A. Curtis - - -	18	6	8
„	„	T. E. Allen - - -	16	13	4
„	„	C. H. Thompson - - } Salaries (discussion, &c. of observations).	12	10	0
„	„	S. Call - - -	11	13	4
„	„	R. G. Canham - -	7	10	0
„	„	A. H. Bell - - - }	7	10	0
„	„	F. Gaster - - - }	25	15	7
„	„	F. J. Brodie - -	18	5	7
„	„	G. G. Francis - -	17	16	3
„	„	A. J. Rigby - - } Salaries (preparation, &c. of Weather Reports).	17	6	10
„	„	R. Sargeant - -	12	3	9
„	„	A. R. Simpkins - -	10	6	3
„	„	C. W. Heinemann - - }	5	0	0
„	„	Capt. H. Toynbee - - }	33	6	8
„	„	Nav. Lieut. C. W. Baillie, R.N.	22	18	4
„	„	R. Strachan - -	27	15	6
„	„	C. Harding - - -	22	18	4
„	„	H. Harries - - - } Salaries (discussion, &c. of observations and care of instruments).	15	0	0
„	„	W. Allingham - -	15	0	0
„	„	W. G. James - -	11	5	0
„	„	F. T. Bullen - -	9	3	4
„	„	R. F. Wallace - - }	8	15	0
		Carried forward - - -	£718	1	1

* Paid by draft on a foreign Banker.

		£	s.	d.
1887.	Brought forward - - -	748	1	1
Oct. 31st.	Gas Light and Coke Co., gas - - - -	2	19	0
,, ,,	Postmaster-General, telegrams - - - -	103	14	3
,, ,,	A. Buchan, salary and expenses - - - -	114	12	9
,, ,,	T. W. Baker, travelling expenses - - -	17	17	8
,, ,,	G. M. Whipple, ,, - - -	25	17	6
,, ,,	R. Jenkin, thermometer screen - - - -	2	0	0
,, ,,	F. Gaster, for payment of allowances for late evening and Sunday attendances - - - -	18	5	3
,, ,,	J. S. Harding, jun., petty cash - - - -	50	0	0
		£1,083	7	6

116, *Victoria Street, November* 9, 1887

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN. | MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (November 2) were read and confirmed.

Read the following letter—

(M.O. 2420.)

Royal Society, Burlington House,
November 7th, 1887.

SIR,

I BEG leave to inform you that Professor Stokes has announced to the Council of the Royal Society his wish to resign his position on the Meteorological Council, and that the Council of the Royal Society have accepted his resignation, and have under consideration the nomination of his successor.

Yours, &c.,
(Signed) M. FOSTER,
Sec. R. S.

R. H. Scott, Esq.

With reference to Dr. Meldrum's letter (Minutes, p. 47), Mr. Scott was instructed to reply (P.C. 2297) that the Council would propose to publish the typhoon tracks for the district south of the Equator, as soon as the complete data should have been received from the Mauritius, as promised in Dr. Meldrum's letter. They would further be very glad at some future time to receive data for the North Indian Ocean from Dr. Meldrum.

Read—A letter (M.O. 1586) from Mr. Strachan, with reference to the resolution of the Council (Minutes, p. 37), and the following resolution was adopted, Mr. Scott being instructed to communicate it to Mr. Strachan (P.C. 2275):—

The Council, considering that there has been some misunderstanding on the part of Mr. Strachan as to the terms on which the Arctic work should be prepared, will allow him 50*l.* in payment for all overtime for which he may claim up to the present date, but that in future no payment for overtime for this work will be sanctioned unless on a special resolution of the Council. Part V. of the Arctic work will now be completed by Mr. Strachan in his regular office hours.

With reference to the letter from General Greely (Minutes, p. 45) Mr. Scott was instructed to ask if the abandonment of the scheme of synchronous observations was final, in order that the Council might give timely notice of the fact to the Admiralty.

Mr. Scott submitted the following list of the Signal Office publications :—

LIST of UNITED STATES PUBLICATIONS.

Title of Publication.	Date of Commencement.	Date of Completion.
Daily Weather Maps, formerly tri-daily, subsequently for 7.35 a.m. only.	1871, June 7 - - -	In progress.
Daily Bulletin of Simultaneous Weather Reports	1872, September - -	1877 December.
Bulletin of International Meteorology, continued as "Summary and Review" of International Meteorological Observations.	1875, January - -	1884, June 30. In progress.
Daily Bulletin of Simultaneous Weather Reports for United States of America.	1876, January - -	1880, December.
Monthly Weather Review - - -	1873, December - -	In progress.
Weather Reports (Daily Bulletin). Yellow paper, thin copies.	1871, July - - -	1875, December.
Meteorological Record - - - -	1874, January - -	1875, June.
Annual Reports - - - -	1871 - - - -	In progress.
Tri-daily Meteorological Record - -	1878, January.	——
Professional Papers - - - -	Nos. 1–3, 5–6, 8–15, and 18.	——
Signal Service Notes - - - -	Nos. 1–20, 22–23.	——

Read.—Letter 2139 from Staff Commander Clapp, Inspector of Lighthouses at the Bahamas, recommending the supply of a set of instruments to the newly erected lighthouse on Watling Island.—Approved.

Reported—that a rain-gauge had been sent to Mr. Ford, of Valua Island, Banks Group, on the recommendation of Lieutenant Field, H.M.S. "Dart" (Letter 1647).—Approved.

Submitted the following :—

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the last Meeting of the Meteorological Council, naming the Hour of Issue, the Coasts warned, the Signal hoisted, the Gales experienced (with approximate time of their occurrence), and the Result, as to the Character of the Warning.

1. WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signals hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result. — Character of Warning.*
1887.				
Nov. 2nd, 3.30 p.m. -	Ireland, S. -	South cone	Fresh S.Ely. gale, evening and night 2nd.	A
„ 4.50 p.m. -	„ E. -	„	Moderate S.Wly. gales, night of 2nd.	B
„ „ -	Scotland, W. -	„	Strong Sly. gale, night of 2nd -	A
„ „ -	England, N.W. -	„	Strong N.Wly. wind, on afternoon 4th.	B
„ „ -	„ W. -	„	Strong S.Wly. gale, on night of 2nd	A
„ „ -	„ S.W. -	„	Fresh Sly. to Wly. gale, night of 2nd and on 3rd.	A
„ 5.40 p.m. -	„ S. -	„	Fresh to strong S.Wly. gale, night of 2nd and again on 3rd.	A
„ „ -	„ S.E. -	„	„ „ „	A
„ „ -	„ E. -	„	Fresh to strong Sly. gale, night of 2nd.	A
„ 7.0 p.m. -	Scotland, E. -	„	Strong to whole S. and S.E. gale, night of 2nd. (The gale was less strong over the Irish Sea than elsewhere, owing to the advance of a shallow secondary disturbance to Wales early on the 3rd, which reduced the gradients in that region.)	A

* A = complete success (*i.e.* justified by gales of force 8, or more; Beaufort's scale).
B = partial „ („ „ winds „ 6 or 7 „).
C = failure „ („ not justified by either gales or strong winds).

Day and Hour of Issue.	Coasts warned.	Signals hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result. — Character of Warning.
1887.				
Nov. 5th, 9.40 a.m. -	Ireland, S. -	South cone	Fresh Sly. gale, afternoon of 5th -	A
„ „ -	„ E. (southern part only).	„	„ „ „ -	A
„ „ -	England, N.W. (southern part only).	„	Neither gales nor strong winds -	C
„ „ -	„ W. -	„	Strong S.Wly. winds, evening of 5th.	B
„ „ -	„ S.W. -	„	Moderate Sly. gales, afternoon and evening 5th.	B
„ 11.20 a.m. -	„ S. -	„	Fresh to strong Sly. gales, night of 5th.	A
„ „ -	„ S.E. (mouth of Thames)	„	„ „ „	A
„ 7.0 p.m. -	Ireland, E. (northern part).	„	Fresh gale from (?) S.E., night of 5th.	A
„ „ -	Scotland, E. -	„‡	Neither gales nor strong winds reported.	C
„ „ -	„ W. -	„‡	„ „ „	C
„ „ -	England, N.W. (northern part).	„	„ „ „	C
„ „ -	„ S.E. (excepting mouth of Thames).	„	Strong Sly. winds, night of 5th -	B
„ „ -	„ E. -	„‡	Neither gales nor strong winds -	C
Nov. 6th, 9.30 a.m. -	Ireland, E. (northern part).	North cone	Strong N.Ely. gale, on 7th - -	A
„ „ -	Scotland, E. -	„	Fresh N.Ely. gale, night of 6th, and continuing on 7th.	A
„ „ -	„ W. -	„	Fresh N.Ely. gale, night 7th -	A
„ „ -	England, E. (northern part).	„	Moderate N.Ely. gale, on 7th -	B
Nov. 7th, 0.30 p.m. -	Ireland, E. (central part).†	„	Apparently a moderate N.Ely. gale, on 7th.	Warning late.
„ „ -	England, N.W. -	„	Strong N.Ely. winds, night of 7th, morning of 8th.	B
„ „ -	„ S. (Kentish coast).	„	Neither gales nor strong winds -	C
„ „ -	„ S.E. -	„	Strong and squally Ely. winds, evening of 7th.	B
„ „ -	„ E. (southern part).	„	Strong and squally Ely. winds, on 7th.	B

† Information from these coasts insufficient to give very reliable results.
‡ On these coasts the north cone was substituted for the south cone on the 7th.

2. There have been no gales experienced without any warning.

FREDC. GASTER.

Telegraphic Branch,
9th November 1887.

116, *Victoria Street, November* 16, 1887.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	MR. STONE.
MR. GALTON.	THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (November 9) were read and confirmed.

The following draft reply to the Directors of the Ben Nevis Observatory (Minutes, p. 44) (P.C. 2378) was adopted :—

(M.O. 1703.)

I AM instructed by the Meteorological Council to inform you that your letter of the 8th August last, relative to the weather telegrams sent from the Ben Nevis Observatory to the Meteorological Office during the year 1886, was laid before them and considered at the first meeting they have held since that letter was received.

In reply, I am to express to the Directors of the observatory the regret of the Council that the object of the memorandum referred to in your letter, and their motives in sending it to you, should have been much misunderstood. That this has been the case appears from your comments upon it, and from the letter of Mr. Omond, the Superintendent of the Ben Nevis Observatory, published in the newspapers shortly after your letter was written, as well as from the report on the observatory presented to the British Association at its meeting at Manchester, which the Council have just seen.

From inquiries instituted with a view to ascertaining, if possible, how this misunderstanding has arisen, it has been brought to light that the copy of the memorandum forwarded to you with my letter of the 30th July last was an imperfectly corrected proof of a report which, by an oversight, was sent instead of the correct form in which it appears on the Minutes of the Council. The memorandum in question was drawn up in the forecasting department of the Office, and submitted to the Council at the end of May, but the language in which it was at first expressed having been considered unsuitable, it was considerably modified, the form in which it was approved, and is recorded on the Minutes, having been settled on the 6th June, and in this form it was added to the Annual Report of the Council to the Royal Society, and should have been communicated to you. A correct copy is now annexed.

The Council have further ascertained, much to their surprise and annoyance, that this very regretable error was repeated in the absence from London of their Secretary, and that a copy of the same uncorrected proof was furnished to a Treasury official, in consequence of an inquiry addressed to the Office previous to the debate that arose in the House of Commons on the vote for the Meteorological Office, and was quoted by Mr. Jackson in that debate.

The words to which exception appears to have been specially taken are found in the last sentence of the memorandum. In the uncorrected proof they were "In their existing form the telegrams are absolutely useless." The two last words were struck out by the Council, and for them were substituted "have given us no assistance." Alterations were also introduced in the headings of the statement annexed to the memorandum, in the absence of which the imperfect proof was also misleading.

The memorandum expressly stated that it had reference only to the telegrams from Ben Nevis, *as at present sent*, in connexion with the storm warnings issued by the Meteorological Office. When the Council, in 1883, informed you that they did not wish for daily telegrams from Ben Nevis and Fort William, it was intimated that for the ordinary daily forecasts the value of such telegrams did not appear likely to justify their cost. As it was thought, however, that in exceptional cases telegrams from Ben Nevis reporting sudden changes of atmospheric conditions might be useful, the Council requested that such telegrams might be sent at the discretion of the Superintendent of the Observatory. It was exclusively to these telegrams that the memorandum in question had reference, and what it discussed was not the absolute value of the observations, but merely their utility in relation to their cost, in aiding the preparation of the weather forecasts at the Meteorological Office, and the consequent issue of storm warnings. For ready reference, the precise words used by the Council in their letter of the 3rd December 1883 are annexed.

(P.C. 2453.)
(M.O. 2408 and 2409.)

DEAR MR. BUCHAN, December 3, 1883.

IN reply to your two letters, I have to inform you—

Firstly, that the Council will allow the 100*l.* for the current year, and of course for the future, while the observatory goes on, only subject to the Government paying our grant. This we have always to stipulate.

Secondly, we shall thank you very much for copies of the monthly sheets.

We do not at present wish for regular telegrams ; the cost of three a day from Ben Nevis and Fort William would be about 120*l.* a year, and as we do not see how exactly to use them from day to day, we wish to wait till at least your results have been published.

However, we should wish Mr. Omond to use his own discretion, and telegraph to us whenever any very striking change of conditions, or a special phenomenon of great interest is recorded. No regular rules can be laid down for such a service ; we must only try it and see what we get out of it. He may be somewhat liberal in telegraphing at first at least.

Yours, &c.
(Signed) ROBERT H. SCOTT.

P.S.—As soon as we get permission from the P.O. we will send passes.

From this it will at once be seen that the Council expressed no opinion on the general scientific character of observations made on Ben Nevis, and deferred forming a judgment as to their utility for forecasting until they had been properly discussed, an opinion which is repeated in the memorandum now in question, with the addition, moreover, of an express reservation as to the possibility of their being made use of hereafter when such a discussion should have taken place.

The Council, and its officers specially charged with the duty of preparing the forecasts, came to the conclusion, on the evidence of the facts summarized in the statement annexed to the memorandum, that the telegraphic reports from time to time received from Ben Nevis under the limitations above stated did not in any important degree add to the value of the data to be considered on each occasion, either in relation to their general character, or in supplying intimation of probable change that was not already given by reports from other stations.

This conclusion which they thought it right to communicate to you, whether it was rightly or wrongly come to, was simply based on the facts as viewed at the Meteorological Office ; and in the absence of any conceivable motive for disregarding or rejecting information found to be really useful, and considering the obvious natural desire to render the forecasts as good as possible, the Council see no reason to modify that conclusion.

The Council, I am to observe, made no such statement as that suggested in your letter (based on the imperfect copy of the memorandum sent to you), "that weather telegrams from Ben Nevis observatory are useless." They have never called in question the value of the observatory; on the contrary, they have contributed to its construction, and they still contribute to its maintenance, their contributions having been regulated by their financial position in relation to the various claims upon them. What they have questioned is merely the financial expediency of incurring the necessary expense of regular daily telegrams from Ben Nevis, such as those sent from the ordinary telegraphic reporting stations of the Office.

As you are no doubt well aware, the number of these telegraphing stations is very considerable, there being 19 in England, Wales, and the Channel Islands, 7 in Scotland, and 6 in Ireland, 10 in Scandinavia, and 17 elsewhere on the continent of Europe. They are distributed over and around the British Isles at places which, after careful consideration and prolonged experience, have been selected as best suited for the transmission to the central office of the information required in preparing the daily weather forecasts. From obvious financial reasons the number of these stations must be limited, and needless reduplication of reports avoided, and a selection therefore has to be made from among the many places where suitable observations would be available. Many circumstances, among which geographical position is prominent, combine to determine the greater or less value or importance of the several stations for the special purpose for which they are established, and it by no means follows that the strictly scientific value of the observations made at any particular place is a sufficient reason for including it among the stations employed for furnishing reports on which to form estimates of the probable changes of atmospheric conditions over the British Isles and their coasts which are supplied in the daily weather forecasts. Owing to such considerations it has happened that the list of telegraph stations contains the names of many places the observations made at which have comparatively small claim to independent scientific value, while it does not include Greenwich, Kew, Falmouth, Stonyhurst, Glasgow, or Ben Nevis.

The Council readily recognise that such a question as that of the selection of the telegraph reporting stations is one on which opinions may reasonably differ. It has certainly been their wish to obtain the requisite information from the localities best suited for the purpose, and they have taken the steps which in their judgment were most likely to lead them to a sound conclusion.

I am, finally, directed to express the great regret of the Council for the error which has given rise to this correspondence, and for any injurious consequences that may have arisen from it, and at the same time to assure the Directors of the Observatory that it had been, and will continue to be, the desire of the Meteorological Council to assist the work carried on under them on Ben Nevis to the best of their ability, within the limits which they find to be consistent with other claims upon the funds at their disposal, and they will take an early opportunity of addressing you again on this subject.

Mr. Scott was instructed to forward the following letter to the Treasury (Minutes, p. 45) (P.C. 2379) :—

THE SECRETARY TO THE TREASURY,

IN August last, shortly before the debate in the House of Commons on the grant for the Meteorological Council, inquiry was made by the Treasury as to the opinion formed in the Meteorological Office relative to weather telegrams sent to that Office from the observatory on Ben Nevis. A paper purporting to be a copy of a memorandum on the subject was accordingly furnished to the Treasury, the substance of which seems to have been quoted by you in the course of the debate.

I am now directed to inform you that the Meteorological Council has just ascertained with much regret that, in the absence of the Secretary, by an unfortunate error an imperfectly corrected copy of the first draft of the paper in question was supplied to the Treasury, and that, by a no less regretable oversight, the Directors of the Ben Nevis Observatory had also been furnished with a similarly inaccurate copy.

The nature of the error, and of the misunderstanding that has arisen from it, as well as the position in which the Meteorological Council is placed in relation to the Ben Nevis Observatory, will, it is believed be fully explained by the accompanying copy of a letter which the Council has caused to be written to Mr. Buchan, the Secretary of the Directors of the Observatory, in reply to a communication from him, of which also a copy is forwarded.

The Meteorological Council desire to express their great regret that these errors, of which they were entirely ignorant till a few days ago, should have been committed, and should have led to such misconceptions, and they desire to offer their apologies in behalf of the Office for any inconvenience they have caused.

With reference to various recommendations on the inspectors' reports, Mr. Scott was instructed—

(1.) To have the barograph and thermograph from Armagh put in complete order. (M.O. 2381.) (P.C. 2424).
(2.) To supply new thermometers for the standard barometers at Falmouth and Aberdeen.
(3.) To supply a new standard barometer to Valencia.
(4.) To authorise Valencia to use A. G. B. paper for photography as soon as the stock of waxed paper is exhausted.
(5.) To have the anemograph fans at Aberdeen repaired.
(6.) To add Stonyhurst lifters to the Beckley rain-gauges where required.
(7.) The transit instrument for Falmouth not to be supplied.

With reference to Mr. Strachan's work on the "Arctic Contributions" (Minutes, p. 80), Mr. Scott submitted to the Council the MS. of Part V. as far as at present discussed, which he had received from Mr. Strachan. The subject was then reconsidered, and it was resolved to present to Mr. Strachan a honorarium of 31*l.* 10*s.* for his own share in Part IV., and a similar sum for Part V.

It was also explained to Mr. Strachan, who was present, that no allowance for overtime work could be sanctioned in future, unless under written authority from the Council.

Read—A memorandum from Captain Toynbee reporting that since the last meeting five logs had been received, all of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. Ed. Ashdown, Log kept by Mr. H. S. Blackburne	S.S. "Brindisi"	July 7 — Nov. 6, 1887.	China viâ Suez - -	— 1886, p. 126.
Capt. G. A. Chaddock	Barque "Elissa"	Dec. 6, 1886—July 15, 1887.	Pensacola, Rosario, and Mauritius.	1886, p. 88.
Capt. Joseph Davies	S.S. "Flaxman"	July 10, 1886—April 17, 1887.	Liverpool to Buenos Ayres.	1886, p. 48.
Capt. W. F. Milne -	S.S. "Esquimaux."	Feb. 10—Nov. 6, 1887.	Dundee to Newfoundland and Davis Straits.	1886, p. 88.
Capt. S. Trott -	S.S. "Minia" -	July 17—Oct. 31, 1887.	Falmouth to Halifax, Nova Scotia.	1887, p. 37.

Mr. Scott was instructed to present the Charts (O. 32) to Captain Ashdown and to convey the best thanks of the Council to the other observers.

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the last Meeting of the Meteorological Council, naming the Hour of Issue, the Coasts warned, the Signal hoisted, the Gales experienced, and the Result—as to the character of the Warning.

1. WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any) and approximate Time of Occurence.	Result. Character of Signal.*
1887. Nov. 13th, 6.45 p.m.	Ireland, S. (excepting Galway).	North cone	Neither gales nor strong wind -	C
,, ,,	,, E. (southern part).	,,	,, ,, ,,	C
,, ,,	England, N.W. (southern part).	,,	,, ,, ,,	C
,, ,,	,, W. -	,,	,, ,, ,,	C
,, ,,	,, S.W. -	,,	,, ,, ,,	C
,, ,,	,, S. -	,,	,, ,, ,,	C
,, ,,	,, S.E. -	,,	Strong N.Ely. winds early on 14th	B
,, ,,	,, E. (southern part).	,,	,, ,, and moderate 14th.	B

None of these warnings would have been issued but for a serious error of two-tenths of an inch in the reading of the barometer at Scilly on the evening of the 13th. This gave the appearance of a deep depression being formed at the mouth of the Channel, whereas there was nothing of the kind.

Signals were lowered except in England S.E. and E. early on the 14th, and the observer at Scilly has been written to very strongly.

* A = complete success (*i.e.*, justified by gales of force 8 or more, Beaufort's scale).
B = partial ,, ,, ,, strong winds or moderate gales, (forces 6 and 7).
C = total failure (*i.e.*, not justified by either gales or strong winds).

2. There have been no gales experienced without warning.

(Signed) FREDC. GASTER.

Telegraphic Branch,
16th November 1887.

Read—Letter 2476 from Lloyd's, asking for an extra allowance to the observer at Malin Head, in consequence of the distance of the signal tower from his residence, and the fact that he had to pass over that distance after dark in winter.—The increase of the allowance to 7*s.* 6*d.* per week was authorised (P.C. 2341).

116, *Victoria Street, November* 30, 1887.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	MR. STONE.
MR. GALTON.	THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (November 16) were read and confirmed.

With reference to the resignation of Professor Stokes (Minutes, p. 80), the following resolution was adopted, and the Secretary was instructed to communicate it to Professor Stokes (P.C. 2439):—

Resolved—That the Meteorological Council, having been informed of the withdrawal of Professor Stokes from their body, desire to record their sense of the high value of his services while a member of the Council, and their regret that circumstances should have deprived them of a colleague so eminently qualified to aid them with his advice and give weight to the results of their deliberations.

The Secretary was further instructed to inform Professor Stokes that the Council would be most happy to present to him in future any of their publications which he might wish to possess.

Read—Letter 2466 from Dr. Meldrum (Minutes, p. 80). Mr. Scott was instructed to inform him that the Council proposed to prepare charts of the monthly distribution of cyclone tracks, and also to have blank charts of the Indian Ocean prepared, the scale, &c. to be fixed by the Hydrographer.

Read—A memorandum from Captain Toynbee reporting that since the last meeting six logs had been received, five of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. J. Donaldson	"Gareloch" -	Oct. 22, 1886—Nov. 18, 1887.	Glasgow, Sydney, Rangoon, and home.	—
Capt. C. M. Hepworth, R.N.R., F.R.Met.Soc.	S.S. "Port Pirie"	July 12—Nov. 25, 1887.	London, Adelaide, viâ Cape of Good Hope. Home, viâ Suez.	1883, p. 99.
Capt. J. Maxwell -	"Oamaru" -	Feb. 4—Nov. 22, 1887.	London, Auckland, Oamaru, and home.	1886, p. 65.
Capt. A. Simpson -	S.S. "Australasian."	June 29—Nov. 20, 1887.	London, Sydney, viâ Cape of Good Hope. Home, viâ Suez.	1887, p. 32.
Capt. W. Waring -	S.S. "Breconshire."	June 25—Nov. 29, 1887.	London, China, Japan -	1887, p. 28.

Mr. Scott was instructed to present the Charts (O. 27) to Captain Donaldson, and to convey the best thanks of the Council to the other observers.

Submitted—The following memoranda :—

MATERIALS for preparing ESTIMATES for 1888–89.

	Data for framing Estimates.	Estimated Expenditure for 1888–89.	Proposed for for 1888–89.	Proposed for 1887–88.
Administration :	£	£	£	£
(1.) Council	- -	1,000	1,000	1,000
(2.) Secretary	- -	800	800	800
(3.) Salaries :*	- -	800	810	800
Amounts authorised for 1888–9 :—				
Chief Clerk	333			
1 Junior Clerk	195			
2 unclassified clerks	104			
Office Keeper	109			
Messenger	65			
	806			
(4.) Rent, fuel, and lighting	- -	720	720	730
Payments for one year ending 30th Sept. 1887 :—				
Rent	635			
Fuel	54			
Gas	29			
	718			
(5.) Incidental and contingent expenses	- -	500	500	500
Payments for one year ending 30th Sept. 1887 :—				
Office Keeper's contingent account, including porter's allowance for cleaning, &c.	187			
Postage	75			
Furniture and Office repairs	125			
Carriage of parcels, &c.	17			
Stationery Office : Annual Reports and sale of forms	93			
Copying synchronous observations	12			
Books	15			
Sundries	21			
	545			
Deduct repayments under this head, including "Commission"	43			
	502			
(6.) Pensions	- -	43	40	40
Mr. J. S. Harding, senr.				
Special Researches and Experiments	- -	1,000	1,000	1,000
*Salaries :—				
Amounts authorised for 1888–9 :—				
Harmonic analysis (Mr. Sheerman)	135			
Female staff	195			
Other payments for one year ending 30th September 1887 :—				
Bridled anemometer (Holyhead)	12			
Scilly anemometer (now charged to Telegraphy)	3			
Cloud experiments	77			
Sunshine cards	36			
Electrical anemometer	96			
Experiments with Atlantic charts	12			
Discussing R.E. and other observations	91			
	657			
Deduct repayments under this head	24			
	633			
The amount under this head is, as usual, put at 1,000*l.*, without regard to expenditure.				
Carried forward	- -	4,863	4,870	4,870

* Increments specified in Minutes of 1884–5, allowed for.

	Data for framing Estimates.	Estimated Expenditure for 1888–89.	Proposed for 1888–89.	Proposed for 1887–88.
	£	£	£	£
Brought forward - - -	- -	4,863	4,870	4,870
Land Meteorology:				
(1.) Observatories and stations - - - - (Allowances and other payments for one year ending 30th Sept. 1887):—	- -	1,820	1,800	1,800
Aberdeen - - - - - -	274			
Armagh - - - - - -	51			
Falmouth - - - - - -	249			
Glasgow - - - - - -	74			
Kew - - - - - -	408			
Stonyhurst - - - - -	55			
Valencia (including rent) - - - -	466			
Anemograph stations - - - -	82			
Observations supplied by Meteorological Societies -	116			
Instruments - - - - -	69			
Sundries - - - - - -	7			
	1,851			
The charge for instruments will perhaps be small. Deduct, say - - - - - -	30			
	1,821			
(2.) *Salaries:—Discussion and reduction of observations - Amounts authorised for 1888–89:—	- -	1,325	1,320	1,320
2 Senior Clerks - - - -	500			
5 Junior Clerks - - - -	685			
3 Unclassified Clerks - - - -	129			
	1,314			
This list includes the late Pantagraph Branch, now engaged on the Quarterly Weather Report, and the Computation and Examination Branches. There will be probably an increase in the pay of the unclassified clerks.				
Weather Information and Forecasts - - -	- -	2,200	2,280	2,350
(1.) Telegraphic reports and storm warnings: Payments for one year ending 30th September 1887:—				
Reports from U.K. to Meteorological Office -	536			
Reports sent abroad - - - -	465			
Reports from abroad - - - -	206			
Storm warnings - - - -	265			
Hay harvest forecasts - - - -	26			
Private wires - - - - -	91			
Payments to reporters, &c. - - -	686			
Reports to Jersey - - - -	30			
Sundry telegrams, forecasts, &c. - -	14			
Postage of charts and incidental expenses -	232			
Instruments, screens, &c. - - -	23			
Synoptic charts (Foreign) - - -	38			
Wrappers, printing, &c. - - -	29			
Sundries - - - - -	9			
Ben Nevis Observatory - - -	100			
	2,750			
Repayments during the same period - - -	643			
	2,107			
Add 100*l.* as per note† - -	100			
Carried forward - - -	2,207	10,208	10,270	10,340

* Increments specified in Minutes of 1884–5, allowed for.

† These amounts contain only 11 monthly payments to the Post Office; about 100*l.* should be added.

	Data for framing Estimates.	Estimated Expenditure for 1888–89.	Proposed for 1888–89.	Proposed for 1887–88.
	£	£	£	£
Brought forward - - -	- -	10,208	10,270	10,340
(2.) *Salaries:—Preparation and issue of reports and forecasts (Amounts authorised for 1888–9 :—	- -	1,665	1,670	1,670
1 Senior Clerk (9 hours daily) - - -	309			
6 Junior Clerks (5 work 9 hours daily) - -	999			
2 Unclassified Clerks - - - -	90			
1 Messenger - - - - -	62			
Addition for late evening and Sunday attendance. The payments for this, for one year ending 30th Sept. 1887, were - - - -	199			
	1,659			
There will probably be an increase in the pay of the unclassified clerks. The vacancy on the classified staff caused by Mr. Stevens's death is not yet filled up—except by an unclassified clerk.				
Inspections - - - - - - - -	- -	550	550	550
Salaries of Messrs. Buchan and Ley - - -	300			
Travelling Charges for year 1886–7.				
Mr. Baker - - - - - -	16			
Mr. Buchan - - - - - -	53			
Mr. Ley - - - - - -	61			
Mr. Scott - - - - - -	52			
Mr. Whipple - - - - - -	47			
Contribution to Royal Meteorological Society - -	25			
Sundry small amounts - - - - -	6			
	560			
Ocean Meteorology :				
(1.)* Salaries :—Discussion and reduction of observations (Amounts authorised for 1888–9 :— - -	- -	1,890	1,890	1,870
Marine Superintendent - - - -	400			
Assistant „ - - - -	275			
1 Senior Clerk (in charge of instruments) -	333			
1 „ „ („ Marine Rooms) -	275			
5 Junior Clerks - - - - -	730			
2 Unclassified Clerks - - - -	78			
	2,091			
Deduct proportion chargeable to care and issue of instruments (say) - - - -	200			
	1,891			
(2.) Salaries:—Proportion chargeable to care and issue of instruments - - - - -	- -	200	200	200
(3.) Supply of instruments to the Royal Navy - -	- -	390	350	300
Payments for one year ending 30th Sept. 1887 :—				
Instruments, repairs, &c. - - -	368			
Verifications - - - - -	72			
	440			
(4.) Supply of instruments, &c. to Mercantile Marine -	- -	390	350	350
Payments for one year ending 30th Sept. 1887 :—				
Instruments and repairs - - -	161			
Verifications - - - - -	28			
Agents fees, &c. - - - -	146			
Packing cases - - - -	11			
Presentation labels - - - -	5			
Sundries - - - - -	9			
[Receipts during the same period 28*l.*]	360			
There is not much regularity about charges for instruments. The estimated expenditure under the preceding heads is taken as the mean of two years ending 30th Sept. 1887.				
(5.) Distant island or coast stations - - -	76	20	20	20
There are no regular payments under this head. The charges in the first column were for the establishment of stations at Heligoland and the West Coast of Africa.				
Totals - - - - £	- -	15,313	15,300	15,300

* Increments specified in Minutes of 1884–5, allowed for.

The actual expense, estimated as closely as possible from the previous year and making allowance for possible changes, is slightly above 15,300*l.* This leaves the sum for special researches at the full amount of 1,000*l.* and some little margin under Telegraphy, amounting altogether to about 450*l.*; on the other hand the amounts allowed under Royal Navy and Mercantile Marine are somewhat too low.

SYNOPSIS of OFFICE SALARIES.

Service.	1888-89.	1887-88.	1888-89. Increase.	1888-89. Decrease.
	£	£	£	£
Administration	1,606	1,598	8	—
Special Researches	330	377	—	47
Land Meteorology	1,314	1,279	35	—
Weather Information	1,659	1,667	—	8
Ocean Meteorology	2,091	2,072	19	—
Totals £	7,000	6,993	62	55

In the above statement the payment of 1,000*l.* to the Council is not included.

The amounts stated are the salaries authorised for the respective years, so far as at present known, with the addition of an approximate amount for late evening and Sunday attendance.

[J. S. H.]

METEOROLOGICAL OFFICE. ESTIMATES for the Year 1888-89.

Heads of Service.	Proposed for 1888-89.		Proposed for 1887-88.		1888-89. Increase.	1888-89. Decrease.
Administration:	£	£	£	£	£	£
Payment of Council	1,000		1,000			
Secretary	800		800			
Salaries and wages	810		800			
Rent, fuel, and lighting	720		730			
Incidental and contingent expenses	500		500			
Pensions	40		40			
		3,870		3,870	—	—
Special Researches and Experiments		1,000		1,000		
Land Meteorology:						
Observatories and stations	1,800		1,800			
Discussion and reduction of observations	1,320		1,320			
		3,120		3,120	—	—
Weather Information and Forecasts:						
Telegraphic reports and storm warnings	2,280		2,350			
Preparation and issue of reports and forecasts	1,670		1,670			
		3,950		4,020		70
Inspections:						
Salaries and travelling expenses		550		550	—	—
Ocean Meteorology:						
Discussion and reduction of observations	1,890		1,870			
Expenses incidental to the supply of instruments:						
Care and issue of instruments	200		200			
Royal Navy	350		300			
Mercantile Marine	350		350			
Distant islands (and coast) stations	20		20			
		2,810		2,740	70	—
Totals £		15,300		15,300	70	70

[R. S.]

The estimates were approved, and the Secretary was instructed to forward a copy to the Treasury (P.C. 2550).

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the last Meeting of the Meteorological Council, naming the Day and Hour of Issue, the Coasts warned, the Signals hoisted, the Gales experienced (with the approximate Time of their occurrence), and the Result—as to the character of the Warning.

1. WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signals hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result.* Character of Warning.
1887.				
Nov. 16th, 7.30 p.m. -	Ireland, S. (Galway only).	South cone	Strong S.Wly. winds, morning 17th	B
„ „ -	„ E. (northern part).	„	Neither gale nor strong wind -	C
„ „ -	Scotland, E. (northern part).	„	„ „ „ -	C
„ „ -	„ W. -	„	Moderate S.Wly. gale, morning 17th	B
„ „ -	England, N.W.(northern part).	„	Neither gales nor strong winds -	C
Nov. 20th, 7 p.m. -	Ireland, S. -	South cone	Neither gales nor strong winds -	C
„ „ -	„ E. -	„	„ „ „ -	C
„ „ -	England, N.W. (Bangor only).	„	„ „ „ -	C
„ „ -	„ W. -	„	Strong S.Ely. winds, morning 21st	B
„ „ -	„ S.W. -	„	Neither gales nor strong winds - [I cannot see how the issue of these warnings could have been avoided, as the baric fall in the W. was very decided, and the wind was rising from S.E.]	C
Nov. 23rd, 3.40 p.m. -	Scotland, E. (northern part).	South cone	Moderate to fresh Wly. gales, on 24th.	A
Nov. 24th, 10.30 a.m. -	Ireland, S. (Galway only).	„	Strong Wly. winds, night of 24th. (See also warning issued on 26th.)	B
„ „ -	Scotland, W. -	„	Moderate Wly. gales, on 25th -	B
Nov. 25, 4.50 p.m. -	Ireland, S. -	South cone	Fresh S.Wly. gales on 26th and heavy Wly. gale at night.	A
„ „ -	„ E.† -	„	Moderate gales from S.Wwd., 26th and 27th.	B
„ „ -	Scotland, W. -	„	Fresh gales from S.W. on night of 25th, and on 27th.	A
„ „ -	England, N.W. -	„	Fresh S.Wly. gales, morning of 27th.	A
„ „ -	„ W. -	„	Moderate S.Wly. gales on 26th -	B
Nov. 26th, 9.50 a.m. -	Scotland, E. -	„	Strong Wly. gale in northern part, night of 26th.	A
„ „ -	England, S.W. -	„	Strong S.Wly. breezes, 26th and 27th.	B
„ „ -	„ S. -	„	Strong S.Wly. breezes and moderate gales,‡ night of 26th.	B
„ „ -	„ S.E.† -	„	„ „ „	B
„ „ -	„ E. -	„	Moderate to fresh S.Wly. gales, night of 26th, and on 27th.	A

* A = complete success (*i.e.*, justified by gales of force 8 or more by Beaufort's scale).
B = partial „ („ strong winds, force 6 or 7, by Beaufort's scale).
C = failure (*i.e.*, not justified by either gales or strong winds).
† Information at present available for these coasts insufficient to give reliable results.
‡ On the French coasts fresh gales were experienced very generally on night of 26th.

2. There have been no gales experienced without issue of warning.

(Signed) FREDC. GASTER.

Telegraphic Branch,
30th November 1887.

Reported—That the following cheques had been drawn during the month of **November**:—

1887.			£	s.	d.
Nov. 5th.	J. S. Harding, junr., for payment of weekly salaries		16	0	0
„ 9th.	Army and Navy Co-operative Society, lamps		1	12	10
„ 12th.	J. S. Harding, junr., for payment of weekly salaries		16	0	0
„ „	Bank of England, sale of Stationery Office forms		2	2	9
„ „	R. W. Munro, cylinder for Dublin anemometer		4	2	0
„ 16th.	C. Baker, camera for sunshine recorder		2	10	0
„ 17th.	Paris M.O., American telegrams		*9	13	11
„ 19th.	J. S. Harding, junr., for payment of weekly salaries		16	0	0
„ 26th.	„ „ „		16	0	0
„ 30th.	R. H. Scott, Secretary		66	13	4
„ „	J. S. Harding — Office salaries		27	15	6
„ „	T. D. Bell — Office salaries		15	16	8
„ „	J. Sheerman, salary (harmonic analysis)		10	16	8
„ „	J. E. Cullum, salary (Valencia Observatory)		18	15	0
„ „	R. H. Curtis — Salaries (discussion, &c. of observations)		22	18	4
„ „	J. A. Curtis — Salaries (discussion, &c. of observations)		18	6	8
„ „	T. E. Allen — Salaries (discussion, &c. of observations)		16	13	4
„ „	C. H. Thompson — Salaries (discussion, &c. of observations)		12	10	0
„ „	S. Call — Salaries (discussion, &c. of observations)		11	13	4
„ „	R. G. Canham — Salaries (discussion, &c. of observations)		7	10	0
„ „	A. H. Bell — Salaries (discussion, &c. of observations)		7	10	0
„ „	F. Gaster — Salaries (preparation, &c. of Weather Reports)		25	15	7
„ „	F. J. Brodie — Salaries (preparation, &c. of Weather Reports)		18	5	7
„ „	G. G. Francis — Salaries (preparation, &c. of Weather Reports)		17	16	3
„ „	A. J. Rigby — Salaries (preparation, &c. of Weather Reports)		17	6	10
„ „	R. Sargeant — Salaries (preparation, &c. of Weather Reports)		12	3	9
„ „	A. R. Simpkins — Salaries (preparation, &c. of Weather Reports)		10	6	3
„ „	C. W. Heinemann — Salaries (preparation, &c. of Weather Reports)		5	0	0
„ „	Capt. H. Toynbee — Salaries (discussion, &c. of observations and care of instruments)		33	6	8
„ „	Nav.-Lieut. C. W. Baillie, R.N. — Salaries (discussion, &c. of observations and care of instruments)		22	18	4
„ „	R. Strachan — Salaries (discussion, &c. of observations and care of instruments)		27	15	6
„ „	C. Harding — Salaries (discussion, &c. of observations and care of instruments)		22	18	4
„ „	H. Harries — Salaries (discussion, &c. of observations and care of instruments)		15	0	0
„ „	W. Allingham — Salaries (discussion, &c. of observations and care of instruments)		15	0	0
„ „	W. G. James — Salaries (discussion, &c. of observations and care of instruments)		11	5	0
„ „	F. T. Bullen — Salaries (discussion, &c. of observations and care of instruments)		9	3	4
„ „	R. F. Wallace — Salaries (discussion, &c. of observations and care of instruments)		8	15	0
„ „	H. Bond, repairs, &c., in Office		44	5	10
„ „	Royal Meteorological Society, papers on clouds		8	0	0
„ „	Postmaster General, telegrams		113	9	3
„ „	A. Buchan, travelling expenses, &c.		2	1	0
„ „	J. H. Woodstock, packing cases		2	3	0
„ „	F. Gaster, for payment of allowances for extra attendance		15	14	5
„ „	J. S. Harding, jun., petty cash		50	0	0
			£829	10	3

* Paid by draft on a foreign banker.

116, *Victoria Street, December* 14, 1887.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN.	MR. STONE.
MR. GALTON.	THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (November 30) were read and confirmed.

Read—The following letter (Minutes, p. 80) :—

(M.O. 2593.) Signal Office, War Department, Washington City
November 21, 1887.

DEAR SIR,

REFERRING to your letter of 12th instant, I have the honour to advise you that the decision to terminate the system of international meteorological observations on December 31st must be considered final to the extent that the United States will not feel positively under obligations to furnish publications of all such observations as agreed upon at the Vienna Congress. In view, however, of the many urgent requests that this system should be continued after December 31st, the Chief Signal Officer has decided to receive such simultaneous observations as may be voluntarily made and forwarded after January 1, 1888, and in return will use his best endeavours to furnish as a reciprocal courtesy such publications as may be in his power.

He has now in view the publication of a daily international map, commencing October 1, 1886, which, however, must be considered as a tentative arrangement, the continuance of which necessarily depends on the amount of funds and force which Congress may place at the disposal of the Chief Signal Officer.

There is no doubt but that the discontinuance of these observations would cause universal regret. In taking his preceding action and in outlining his present policy, the Chief Signal Officer wishes to be understood as only desirous of freeing the Government which he represents from the embarrassing position in which it stood on his assuming office, that is, it had agreed to furnish in return for these observations certain publications, which the reduction of funds and means of this office had not permitted for a number of years. The Chief Signal Officer has not had, and does not now have, any disinclination to doing on the part of the United States everything that may be possible in furthering the interests of international meteorology by the continuance and publication of this data.

I am, &c.
(Signed) A. W. GREELY,
Brigadier-General and
Chief Signal Officer.

Mr. Robert H. Scott, Secretary,
Meteorological Office, 116, Victoria Street,
London, S.W., England.

It was decided that the Council would abstain from taking any action in the direction of discontinuing the simultaneous observations until more definite information should have been received as to the action of the Chief Signal Office in the matter. If it should appear that the publication of the suggested daily charts is not carried out, the Meteorological Council will probably think it right to propose the discontinuance of the noon simultaneous observations. Mr. Scott was instructed to write to General Greely accordingly (P.C. 2551).

The subject of the utility of the existing telegrams received from the United States was considered (Minutes, p. 20). Mr. Scott was instructed to write to Professor Mascart to inquire if he has formed any definite opinion on the actual results of the use of the Atlantic telegrams, as to their utility for the preparation of forecasts, and to state that the Council are disposed to maintain the view they have before expressed, that these telegrams are of very doubtful utility.

Mr. Scott reported that, with the Chairman's sanction, he had purchased from the Royal Meteorological Society 100 copies of a paper on a proposed international nomen-

clature of clouds by Messrs. Abercromby and Hildebrandsson. He was authorised to distribute it to the observers in connection with the Office, with a request for any comments thereon which might occur to them.

Read—A memorandum from Captain Toynbee reporting that since the last meeting six logs had been received, three of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. J. I. Dunbar-	S.S. "Arracan" -	Aug. 27—Nov. 29, 1887.	Liverpool, Rangoon, and home, viâ Suez.	1887, p. 48.
Capt. G. F. Parson	Earnock -	March 17—Nov. 29, 1887.	Liverpool, Sydney, Rotterdam.	1886, p. 111.
Capt. J. C. Prout -	Cape St. Vincent	Aug. 9, 1886—Dec. 2, 1887.	Cardiff, Basilan (Philippine Islands), Akyab, and home.	1886, p. 48.

Mr. Scott was instructed to convey the best thanks of the Council to the above observers.

Submitted the following:—

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the last Meeting of the Meteorological Council, naming the Day and Hour of Issue, the Coasts warned, the Signals hoisted, the Gales experienced (with the approximate time of their occurrence), and the Result, as to the Character of the Warning.

1. WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any), and Approximate Time of occurrence.	Result.* Character of Warning.
1887.				
Dec. 2nd, 3.40 p.m. -	Ireland, S. (Galway only).	South cone	Strong gale from S.W., night of 2nd.	A
„ „ -	„ E. (northern part).	„	Moderate gale from S.W., on 3rd -	B
„ „ -	Scotland, E. (northern part).	„	Strong to whole gale from W., night of 2nd.	A
„ „ -	„ W. -	„	Moderate gale from S.W., night of 2nd.	B
„ 7.0 p.m. -	Ireland, E. (southern part).	„	Strong S.Wly. winds, on 3rd -	B
„ „ -	Scotland, E. (southern part).	„	Strong gale from S.W., morning of 3rd.	A
„ „ -	England, N.W. -	„	Strong S.Wly. winds, on 3rd -	B
„ „ -	„ E. (Tweed to Humber).	„	Moderate gale from W., afternoon 3rd.	B
Dec. 3rd, 7.30 p.m. -	Ireland, S. (except Galway).	South cone	Strong Nly. wind, morning of 4th -	? B
„ „ -	England, W. -	„	Neither gales nor strong winds -	C
„ „ -	„ S.W. -	„		C
„ „ -	„ S. -	„		C
„ „ -	„ S.E. -	„		C
„ „ -	„ E. (south of Hull).	„		C
Warnings extended rather too far.				
Dec. 5th, 3.45 p.m. -	Ireland, S. - -	South cone	Fresh to strong Sly. gales, night 5th	A
„ „ -	„ E. -	„	„ „ „ -	A
„ 5.15 p.m. -	Scotland, E. (northern part only).	„	Moderate Sly. gale, afternoon 6th -	B
„ „ -	„ W. -	„	Strong Sly. gale, night of 5th -	A
„ „ -	England, N.W. -	„	Strong Sly. to Wly. gales, on 6th -	A
Dec. 6th, 10.20 a.m. -	England, S. -	South cone	Fresh S.Wly. gales, on 6th -	A
„ „ -	„ S.E. -	„	Moderate S.Wly. gales, afternoon 6th.	B

* A = complete success (*i.e.* justified by gales of force 8 or more by Beaufort's scale).
B = partial „ („ strong winds, force 6 or 7 „).
C = failure (*i.e.* not justified by either gales or strong winds).

Day and Hour of Issue.	Coasts warned.	Signals hoisted.	Gales experieneed (if any), and Approximate Time of occurrence.	Result. Character of Warning.
Dec. 7th, 4.50 p.m.	Ireland, S.	South cone	Fresh S.Wly. gales, early on 8th	A
" "	" E.	"	Fresh W.S.W. gales, morning 9th	A
" "	England, N.W.	"	" " "	A
" "	" W.	"	Moderate S.Wly. gales, on 8th	B
Dec. 8th, 9.45 a.m.	England, S.W.	South cone	Moderate to fresh S.Wly. gales, night of 8th.	A
" "	" S.	"	" " "	A
" "	" S.E.	"	" " "	A
Dec. 10th, 3.10 p.m.	Ireland, S.	South cone	Neither gales nor strong winds	C
" "	" E.	"		C
" "	England, W.	"		C
" "	" S.W.	"		C
			These warnings were undoubtedly issued too hurriedly. The baric fall and Sly. wind at Valencia were supported by some cirrus observations at Mullaghmore and Belmullet, but the fall was too local and the cirrus motion too slight to be of a threatening character. Signals were lowered early next morning.	
Dec. 12th, 9.50 a.m.	Ireland, S.	South cone	Fresh Sly. gales, night of 12th	A
" "	" E.	"	" " "	A
" "	Scotland, W.†	"	Strong S.Wly. winds, night of 12th	B
" "	England, N.W.	"	Fresh S.Ely. and Sly. gales, early on 13th.	A
" "	" W.	"	Moderate Sly. gales, on 13th	B
" "	" S.W.	"	Moderate Sly. gale, followed by fresh N.Wly. gale, on 13th.	A
" "	" S. (western part).	"	Fresh to strong Sly. gales, on 13th	A
" 7.0 p.m.	Scotland, E.	"	Fresh Sly. gales, morning of 13th	A
" "	England, E. (northern part).	"	Strong Sly. and S.Wly. winds, on 13th.	B
" 7.45 p.m.	" S. (eastern part).	"	Moderate Sly. gales, early on 13th	B
" "	" S.E.	"	Moderate to fresh Sly. gales, early on 13th.	A
" "	" E. (southern part).	"	Strong Sly. winds and moderate gales, early on 13th.	B

† Information at present available for these coasts insufficient to give reliable results.

2. Gales experienced, but for which no Warnings were issued.

(1.) A strong Westerly gale was felt in the Shetlands and extreme north of Scotland on December 1st. It occurred on the southern side of a large deep depression, the centre of which reached the north-west of Norway early on the 1st, but gave no definite indication of its approach even at 6 p.m. on November 30th.

(2.) A brief, but sharp, gale from the north-westward and northward is reported to have been felt in Caithness and the Shetlands on the 9th, accompanied by much snow. It apparently resulted from a very small secondary disturbance, the movement of which has not yet been traced. Probably it advanced from the north-westward, but at 8 a.m. there was nothing going on at Wick to authorise the issue of warnings. The disturbance was much too local for us to expect to know anything of its approach in such an outlying part of the kingdom, nor do we undertake to warn for such occurrences.

(Signed) Fredc. Gaster.

Telegraphic Branch,
14th December 1887.

The Secretary was instructed to present to the telegraphic reporters the usual bonus of 3*l.* 3*s.* under the same conditions as heretofore (Minutes, 1886, p. 98).

Submitted—The following report on the forecasts for November 1887 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

NOVEMBER.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	35	69	52	89
„	b	46	27	37	
„	c	12	0	6	
„	d	7	4	5	
Scotland, E.	a	38	31	35	75
„	b	35	46	40	
„	c	19	15	17	
„	d	8	8	8	
England, N.E.	a	46	42	44	75
„	b	31	31	31	
„	c	15	12	14	
„	d	8	15	11	
England, E.	a	54	39	47	69
„	b	7	38	22	
„	c	35	19	27	
„	d	4	4	4	
Midland Cos.	a	46	32	39	75
„	b	23	48	36	
„	c	27	16	21	
„	d	4	4	4	
England, S.	a	38	44	41	81
„	b	35	44	40	
„	c	19	12	15	
„	d	8	0	4	
Scotland, W.	a	38	46	42	77
„	b	38	31	35	
„	c	12	8	10	
„	d	12	15	13	
England, N.W.	a	42	46	44	79
„	b	38	31	35	
„	c	12	12	12	
„	d	8	11	9	
England, S.W.	a	42	42	42	63
„	b	23	19	21	
„	c	23	23	23	
„	d	12	16	14	
Ireland, N.	a	32	64	48	72
„	b	24	24	24	
„	c	28	12	20	
„	d	16	0	8	
Ireland, S.	a	28	52	40	72
„	b	44	20	32	
„	c	12	16	14	
„	d	16	12	14	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	47	43	45	85
„	b	37	43	40	
„	c	13	7	10	
„	d	3	7	5	
Scotland, E.	a	47	34	41	77
„	b	33	40	36	
„	c	17	13	15	
„	d	3	13	8	
England, N.E.	a	47	43	45	77
„	b	33	30	32	
„	c	17	17	17	
„	d	3	10	6	
England, E.	a	33	37	35	80
„	b	43	47	45	
„	c	17	10	14	
„	d	7	6	6	
Midland Cos.	a	43	20	32	84
„	b	37	67	52	
„	c	17	7	12	
„	d	3	6	4	
England, S.	a	50	54	52	89
„	b	40	33	37	
„	c	3	10	6	
„	d	7	3	5	
Scotland, W.	a	50	50	50	85
„	b	37	33	35	
„	c	10	10	10	
„	d	3	7	5	
England, N.W.	a	43	47	45	75
„	b	30	30	30	
„	c	27	13	20	
„	d	0	10	5	
England, S.W.	a	52	58	55	80
„	b	28	21	25	
„	c	17	7	12	
„	d	3	14	8	
Ireland, N.	a	35	72	54	78
„	b	34	14	24	
„	c	17	14	15	
„	d	14	0	7	
Ireland, S.	a	35	48	42	74
„	b	34	31	32	
„	c	17	11	14	
„	d	14	10	12	

SUMMARY.

British Isles	a	40	46	43	75
„	b	31	38	32	
„	c	20	13	17	
„	d	9	8	8	
British Isles	a	44	46	45	80
„	b	35	35	35	
„	c	16	11	14	
„	d	5	8	6	

Submitted—The following Statement respecting the Records for October—November 1885 received from the Self-recording Observatories (see Minutes, 21st December 1868, and 20th November 1876, and 3rd January 1883) :—

October 1885.	Aberdeen.		Armagh.		Falmouth.		Kew.		Valencia.	
ANEMOGRAPH :—										
Action of Instrument	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. *Indifft.	Direction. †Good.	Velocity. †Good.	Direction. Good.	Velocity. Good.	Direction. Good.	Velocity. Good.
Records deficient :—										
Due to stoppage of clock	0	0	0	0	0	0	0	0	0	0
„ other causes	0	0	0	0	0	0	0	§1 hr.	**1 hr.	**1 hr.
Number of errors discovered :—										
By general examination	0	0	0	0	0	0	0	0	0	2
Results of 40 Remeasurements :—										
Greatest difference	0·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	2·0
Mean difference irrespective of sign	0·0	0·5	0·1	0·4	0·0	0·4	0·1	0·3	0·1	0·6
Residual difference (—Meteorological Office)	0·0	0·0	−0·1	+0·1	0·0	+0·1	0·0	+0·1	−0·1	+0·1
Orientation verified	21st	—	—	—	15th	—	1st	—	18th	—
RAIN GAUGE :—										
Action of Instrument	¶Good.		Good.		¶Indifferent.‡		‖Indifferent.		Good.	
Records deficient :—										
Due to stoppage of clock	0		0		0		0		**1 hr.	
„ other causes	0		0		0		0		0	
Number of errors discovered :—										
By general examination	0		0		6		4		0	

——	Aberdeen.		Falmouth.		Kew.		Valencia.	
BAROGRAPH :—								
Action of Instrument	Good.		Good.		Good.		Good.	
Character of Photography	Do.		Do.		Do.		Fair.	
Records deficient :—								
Due to stoppage of clock	0		0		0		0	
„ failure of light	0		0		0		§§24 hrs.	
„ other causes	0		††1 hr.		0		**2 hrs. ‖‖7 hrs.	
Number of errors discovered :—								
In entry of standards	0		0		0		0	
„ calculating residuals	0		0		0		0	
„ applying	1		10		0		3	
By general examination	0		1		6		2	
Results of 40 Remeasurements :—								
Greatest difference	·009		·008		·010		·010	
Mean difference irrespective of sign	·004		·003		·003		·004	
Residual difference (—Meteorological Office)	+·001		·000		·000		−·002	
Mean monthly difference between simultaneous Barograph and Standard Barometer readings	(*a.*)		·002		·002		·002	
THERMOGRAPH :—								
Action of Instrument	Good.		Good.		Good.		Good.	
Character of Photography	Do.		Do.		Do.		Do.	
Records deficient :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Due to stoppage of clock	0	0	0	0	0	0	0	0
„ failure of light	0	0	0	0	0	0	0	6 hrs.
„ imperfectly moistened bulbs	—	0	—	0	—	3 hrs.	—	0
„ partially frozen bulbs	—	8 hrs.	—	0	—	0	—	0
„ other causes	0	0	0	0	0	0	** 3 hrs.	**3 hrs.
Number of errors discovered :—								
In entry of standards	0	0	2	3	1	1	0	2
„ maxima and minima	0	—	0	—	5	—	0	—
By general examination	0	0	1	2	3	0	0	0
Results of 40 Remeasurements :—								
Greatest difference	0·3	0·5	¶¶—	0·3	0·3	0·2	0·4	0·2
Mean difference irrespective of sign	0·1	0·2	—	0·1	0·1	0·1	0·2	0·1
Residual difference (—Meteorological Office)	−0·1	+0·2	—	+0·1	0·0	0·0	+0·1	0·0
Mean monthly difference between simultaneous Thermograph and Standard Thermometer readings	0·1	0·2	0·1	0·2	0·2	0·2	0·2	0·2

* Trace intermittent, at low velocities. † Pricker bent, traces marking 10m. late. ¶ Traces faint.
‡ Attachment of curves bad. § Attending to cover. ‖ Irregular action of pencil. ** Cleaning instrument.
†† Cause unknown. §§ Light very bad at times throughout the month. ‖‖ Photographic imperfections.
¶¶ Tabulated at the Meteorological Office. (*a.*) The standards have had to be rejected throughout owing to the slipping of the attached thermometer, and consequent doubt as to the corrections for temperature.

November 1885.	Aberdeen.		Armagh.		Falmouth.		Kew.		Valencia.	
ANEMOGRAPH:—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Action of Instrument	Good.	Good.	Good.	†Indifft.	§Good.	§Good.	Good.	Good.	Good.	Good.
Records deficient:—										
Due to stoppage of clock	0	0	0	0	0	0	0	0	5 hrs.	7 hrs.
„ other causes	0	0	0	0	0	0	0	0	0	0
Number of errors discovered:—										
By general examination	0	0	0	3	0	0	0	0	0	1
Results of 40 *Remeasurements:—*										
Greatest difference	1·0	1·0	1·0	1·0	0·0	1·0	1·0	1·0	1·0	2·0
Mean difference irrespective of sign	0·2	0·3	0·1	0·4	0·0	0·5	0·0	0·5	0·1	0·5
Residual difference (−Meteorological Office)	0·0	−0·2	0·0	+0·1	0·0	−0·1	0·0	0·0	+0·1	+0·1
Orientation verified	28th	—	—	—	13th	—	2nd	—	9th	—

	Aberdeen.	Armagh.	Falmouth.	Kew.	Valencia.
RAIN GAUGE:—					
Action of Instrument	*Good.	Good.	‡Indifferent.‖	‡Indifferent.	Good.
Records deficient:—					
Due to stoppage of clock	0	0	0	0	0
„ other causes	0	0	¶48 hrs.	0	0
Number of errors discovered:—					
By general examination	0	0	4	1	3

——	Aberdeen.	Falmouth.	Kew.	Valencia.
BAROGRAPH:—				
Action of Instrument	Good.	Good.	Good.	Good.
Character of Photography	Do.	Do.	Do.	Fair.
Records deficient:—				
Due to stoppage of clock	0	0	0	0
„ failure of light	0	0	0	0
„ other causes	0	††6 hrs.	0	§§1 hr.
Number of errors discovered:—				
In entry of standards	**—	0	4	0
„ calculating residuals	—	1	0	0
„ applying „	—	5	0	0
By general examination	—	0	0	0
Results of 40 *Remeasurements:—*				
Greatest difference	—	·007	·005	·011
Mean difference irrespective of sign	—	·003	·002	·004
Residual difference (−Meteorological Office)	—	·000	·000	+·001
Mean monthly difference between simultaneous Barograph and Standard Barometer readings	—	·002	·002	·001

	Aberdeen.		Falmouth.		Kew.		Valencia.	
THERMOGRAPH:—								
Action of Instrument	Good.		Good.		Good.		Good.	
Character of Photography	Do.		Do.		Do.		Do.	
Records deficient:—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Due to stoppage of clock	0	0	0	0	0	0	0	0
„ failure of light	0	0	0	0	0	0	0	0
„ imperfectly moistened bulbs	—	1 hr.	—	0	—	1 hr.	—	0
„ partially frozen bulbs	—	25 hrs.	—	0	—	7 hrs.	—	0
„ other causes	0	0	††3 hrs.	††3 hrs.	0	0	0	0
Number of errors discovered:—								
In entry of standards	0	0	2	3	1	1	1	1
„ maxima and minima	0	—	0	—	1	—	1	—
By general examination	0	0	0	0	0	0	0	0
Results of 40 *Remeasurements:—*								
Greatest difference	0·2	0·2	‡‡—	0·2	0·2	0·2	0·3	0·3
Mean difference irrespective of sign	0·1	0·2	—	0·1	0·1	0·1	0·2	0·1
Residual difference (−Meteorological Office)	0·0	+0·2	—	+0·1	0·0	0·0	+0·2	+0·1
Mean monthly difference between simultaneous Thermograph and Standard Thermometer readings	0·2	0·2	0·1	0·1	0·1	0·1	0·2	0·2

* Traces faint. † Trace intermittent in low velocities. § Pricker bent, traces marking 10m. late.
‡ Imperfect action of pencil. ‖ Curves badly attached.
¶ Curve 329 shows ·200 in., and curve 333, ·100 in. less than the check gauge measurement. The latter is corroborated by another gauge; there is no apparent cause for the difference. ** The standards have had to be rejected throughout owing to the slipping of the attached thermometer, and consequent doubt as to the correction for temperatures. †† Face of curve damaged.
§§ Photographic imperfections. ‡‡ Tabulated at the Meteorological Office.

Submitted—The following statements of work during November 1887 :—

MARINE ROOM.

December 14, 1887.

Examined 13 new logs.

North Atlantic Weather Charts.

Received from the lithographer proofs of three sheets of charts for Part IV.

Preparing the additional charts representing September 1–3, 1883, and obtaining the lowest barometer reading in the centre of disturbances.

General.

Preparation and plotting of observations in connection with the cyclones of May and June 1885 in the Arabian Sea and neighbourhood. The total number of ships contributing is now 231, of which 228 yield data for charting. Observations have also been received from, it is believed, all the isolated land stations.

Discussion of Red Sea data—Admiralty and M.O. logs.

Making an enlarged copy of the Indian Ocean cyclone track chart for the month of January.

Copying into log No. 6,905 the observations contained in a rough book.

Indexing data in ocean 10° squares.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH (to 30th November 1887).

Monthly Weather Report, 1887 :—

January in proof; *February* about half done. *March* to *September*, same state as at time of last report. *October*, tables and rough charts prepared.

Weekly Weather Report, 1887 :—

Issued promptly to date.

Appendix I., Part 3 (Quarterly Summary for July–September) was issued very promptly.

All the other appendices are in hand and are brought up as closely to date as possible.

Daily Weather Report :—

Issued promptly to date.

Monthly summary of same and correction and addition sheet for October—issued.

Preparation of pressure and temperature for same (for 1871–85) well in hand.

Checking of Storm Warnings issued.—Done to date. Report handed in herewith.

Checking Daily (3.30 p.m. and 8.30 p.m.) *Forecasts.*—Done to date.

Report on Prevalence of Fog over the British Islands, 1876–85.—Observations extracted for one year.

Plotting of Daily Telegrams received (viâ Paris) from the United States.—Done to date, and all necessary notices sent to Lloyd's.

Checking of Hay Harvest Forecasts, 1887.—Nearly done.

The Monthly Weather Report has at length been taken in hand again, and will be pushed forward with all possible despatch.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

December 1, 1887.

Observatory Returns.—The calculation of the hourly and other means for May 1885 nearly completed, and the copying of the Hourly Readings for the printer is in hand. Proof of "Hourly Readings" for April 1885 has been checked and signed for press. This work was quite stopped during the first 10 days of the month in order to push forward the calculation of the means required for the Kew Observatory Annual Report.

Quarterly Weather Report.—The chart plates for Part IV., 1879, drawn and sent to printer; the Monthly Weather Charts for Part III., 1879, are in hand. Very little has been done during the month to the text of Part III., 1879.

Harmonic Analyser.—The calculation of the barometer results for the year 1877 has been completed, and the analysis of the barograms for 1878 begun. The curves for two stations have been passed through the machine.

Miscellaneous.—Most of my own time has been occupied with proof of Krakatoa report. Sectional drawings were made of portions of the harmonic analyser. Sunshine cards from Bunhill Row from July–September, tabulated for Royal Meteorological Society.

(Signed) R. H. CURTIS.

R. H. Scott, Esq., F.R.S.

EXAMINATION BRANCH.

December 1, 1887.

Examinations.

October 1885:—All stations.
November 1885:—Three *thermograms* and one *barogram*.
Weekly examination (on receipt) of curves and documents from all stations.

Reports, &c.

October 1885:—*Notes of Errors* to Aberdeen, Armagh (*anemograms*), Falmouth, Kew (*anemorams*), and Valencia, and report thereon to Council.
October 1886–*September* 1887.—*Notes of Errors* to Kew (*thermograms* and *barograms*).
Re the remarkable agreement between the daily falls of rain as recorded by the automatic and heck gauges at Aberdeen, with tables.
Re incorrect working of the Falmouth barograph and rain-gauges.
Re comparisons of Standard thermometers by inspectors, with suggestions thereon.

Miscellaneous.

Reconsideration of the "Code of Regulations."
Preparation of the "Diary of Operations, 1888," and revision of proof of same.

(Signed) T. E. ALLEN.

116, *Victoria Street, January* 11, 1888.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.	MR. GALTON.
PROFESSOR DARWIN.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (December 14) were read and confirmed.

Read—The following letter (Minutes, p. 87):—

(M.O. 89.)

DEAR MR. SCOTT, Lensfield Cottage, Cambridge, January 10, 1888.

I FEEL that my apologies are due to the Meteorological Council for the kind, but I fear only too flattering, resolution which they passed on my retirement from their body, for indeed I have felt often how little I was doing for the Office or for Meteorology: for the last, indeed, I can hardly claim anything.

The Council will, I hope, be less disposed to think that I have been unmindful of their kindness when I tell them that shortly before Christmas I went suddenly to Ireland in consequence of the serious illness of my sister.

Will you kindly convey my thanks to the Council?

Yours, &c.
(Signed) G. G. STOKES.

Read—The following letter:—

(M.O. 2793.)

The Royal Society,
Burlington House, Piccadilly, W.,
December 24, 1887

DEAR SIR,

I AM instructed to inform you that Mr. Alexander Buchan has, with the sanction of Her Majesty's Treasury that he may retain his present salary as inspector, been appointed a member of the Meteorological Council.

I am, &c.
(Signed) M. FOSTER,
Secretary, R.S.

R. H. Scott, Esq., F.R.S.

Mr. Scott reported that, on receipt of the above letter, he had, by the Chairman's directions, issued a summons to Mr. Buchan, on which that gentleman had come up for the present meeting.

Read—The following letter (Minutes, p. 94) :—

(M.O. 2778.)

MON CHER COLLÈGUE, Paris, le 21 Décembre, 1887.

Si vous me demandez quelle a été jusqu'à présent l'utilité des dépêches d'Amérique pour la prévision du temps en Europe, je partage l'avis du Meteorological Council et je n'hésite pas à reconnaître que ces télégrammes n'ont rendu que des services très douteux, si non absolument nuls.

Mais la question est de savoir si cette réponse négative tient à la nature des choses ou à la manière dont nous pouvons les interpréter aujourd'hui, et s'il y a lieu de continuer ou d'interrompre l'entreprise.

Dans l'état actuel, ces télégrammes renferment des renseignements sur l'Océan et sur le Continent.

Les dépêches maritimes paraissent avoir été appréciées en France, car dès le début, communication en a été demandée par le Ministère de la Marine, les Chambres de Commerce du Hâvre, de Dunkerque, et la Cie. Transatlantique. La navigation paraît donc y trouver intérêt.

Quant aux dépêches continentales qui donnent la distribution des pressions sur les Etats-Unis, nous espérons qu'en les comparant aux faits observés en Europe, il sera possible de se faire une idée approximative de la position des basses et des fortes pressions sur l'Océan intermédiaire.

Nous allons publier cette année dans les Annales du Bureau Central Météorologique un travail d'un des fonctionnaires du Bureau, Mr. Rollin, qui arrive aux conclusions suivantes :—

"On peut ramener la distribution des pressions sur l'Atlantique à 16 types différents entre l'Europe et l'Amérique ; la connaissance des isobares sur l'ancien et le nouveau Continent détermine le type, par suite la disposition des régions cycloniques et anti-cycloniques sur l'Océan. Cette dernière étant connue, un grand pas aura été fait vers la solution du problème des prévisions."

Voilà, mon cher Collègue, en toute sincérité l'état de la question, mais ces résultats qui pourraient ne pas sembler très encourageants, ne m'enlèvent pas la conviction qu'il est utile, dans l'intérêt de la science, de continuer l'expérience commencée. Permettez-moi d'espérer que le Meteorological Council voudra bien approuver la conservation de ce service et y prêter son concours au moins jusqu'à la prochaine réunion d'un congrès en 1889. On verra alors par une discussion plus générale si les autres pays sont disposés à participer à l'entreprise ou si nous devons y renoncer.

Je reconnais aussi que la transmission même des dépêches laisse beaucoup à désirer et qu'il y a souvent des erreurs regrettables. Mr. le Général Greely que j'ai vu à son passage par Paris, y met la plus grande bonne volonté et il est disposé à prendre toutes les mesures qui permettront d'obtenir une transmission plus correcte. Il y a encore bien des progrès à réaliser.

Je vous serai très obligé si vous voulez bien communiquer au Meteorological Council ces quelques remarques et me transmettre le résultat de sa délibération.

Veuillez agréer, mon cher Collègue, l'assurance de mes sentiments dévoués.

Le Directeur du Bureau Central Météorologique,
(Signé) E. MASCART.

À Monsieur Robert H. Scott,
Secretary of the Meteorological Office, London.

Mr. Scott reported, with reference to the proposed changes in the system of synchronous observations carried out by the Chief Signal Office, Washington (Minutes, p. 94), that the following fresh circular had lately been received :—

The Chief Signal Officer would be much gratified if the international observer receiving this slip will, in his next report of simultaneous meteorological observations, note the highest and lowest barometer readings which have ever occurred at the station (reduced to sea level), with their dates ; and also the highest and lowest air temperatures ever recorded. If this data could be further supplemented by giving similar data for each month in the year, it would be very much appreciated by this service, and would be a valuable contribution to meteorology, since, if a sufficient number of these reports are obtained, the Chief Signal Officer will take pleasure in publishing them for the benefit of meteorologists throughout the world, in connexion with the Summary of International Observations.

(Signed) A. W. GREELY,
Brigadier-General and Chief Signal Officer.

Washington, D.C., December 14, 1887.

TO CO-OPERATING OBSERVERS RECEIVING THE DAILY INTERNATIONAL CHART.

Signal Office, War Department, Washington City,
December 6, 1887.

GENTLEMEN,

I HAVE the honour to transmit to you this date a copy of the Daily International Chart for October 1 and 2, 1886, based on the simultaneous meteorological observations which are made with your valuable concurrence and assistance. The limited force and means at my disposal prevent this service from charting the temperature and from reproducing the data from all stations reporting. In the belief, however, that the great value of these simultaneous maps consists in showing the general features of the weather of the northern hemisphere, I have decided to reproduce daily a chart which will show the general outlines of pressure and the wind for certain selected stations.

It goes without saying that for minute and detailed isobars, each country will have to depend on its own charts, to which these must be considered supplementary.

As has been stated in a preceding circular, the Chief Signal Officer is unable to guarantee the continuance of these charts for any great length of time, but has commenced the work with the hope that its discontinuance will be far distant.

The isobars for the United States are copied directly from the daily map, based on the telegraphic reports for noon, Greenwich mean time.

The attention of co-operating observers is respectfully called to the importance, if these charts are to be at all complete, of forwarding promptly all missing data. Not only is the value of the chart impaired by the unfilled gaps resulting from missing observations, but much extra labour is imposed upon this office in handling reports which come after the original map is completed and before it is reproduced.

I am, &c.
(Signed) A. W. GREELY,
Brigadier-General and Chief Signal Officer.

Mr. Scott was instructed to have charts for the Atlantic for the days in October 1886 for which charts had been forwarded from Washington, prepared in the Office from the materials available.

Reported—That a letter (No. 92) had been received, stating that the electrical anemometer for Valencia had been repaired at the Post Office telegraph works, and forwarded to Valencia.

It was resolved that Mr. Shaw's Report on Hygrometers (Minutes, p. 64) be forwarded for submission to the Royal Society. (P. C. 92.)

Read—A memorandum from Captain Toynbee reporting that since the last meeting five logs had been received, three of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Com. L. S. Dawson, R.N. Lieut. H. H. Douglas, R.N.	H.M.S. "Sylvia."	July 1—Oct. 31, 1887.	Surveying in Red Sea and Mediterranean.	1887, p. 48.
Capt. T. Leportier -	S.S. "Mira" -	Sept. 28—Dec. 19, 1887.	Liverpool, Calcutta, and home, viâ Suez.	1887, p. 48.
Capt. A. S. Thomson, F.R. Met. Soc.	S.S. "Buccaneer."	March 1—May 19, 1887.	West Coast of Africa -	1886, p. 91.

Mr. Scott was instructed to convey the best thanks of the Council to the above observers.

Submitted—The following report:—

SIR, Meteorological Office, December 31, 1887.

I HAVE the honour to report, for the information of the Council, on the work which has been done during the quarter ending 31st December 1887.

Current Charts.

The past quarter has been devoted to the calculation and plotting of the currents contained in the logs of the various steamship companies, which were borrowed for the discussion of the Aden cyclone in 1885.

These logs have been exhausted for all the oceans and also for the Mediterranean, for which sea separate charts have been prepared.

Currents have been extracted from the logs of H.M. ships, which were borrowed for the purpose of the above-mentioned inquiry.

Pressure Charts.

These charts are now in process of binding.

I am, &c.
(Signed) C. W. BAILLIE,
Navigating Lieutenant R.N.

The Marine Superintendent.

Forwarded for the information of the Council.
(Signed) HENRY TOYNBEE,
Marine Superintendent.

Submitted—The following report on the forecasts for December 1887 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

DECEMBER.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	42	52	47	80
,,	b	35	30	33	
,,	c	23	11	17	
,,	d	0	7	3	
Scotland, E.	a	42	59	51	81
,,	b	27	33	30	
,,	c	19	4	11	
,,	d	12	4	8	
England, N.E.	a	52	52	52	78
,,	b	22	30	26	
,,	c	15	11	13	
,,	d	11	7	9	
England, E.	a	56	48	52	84
,,	b	33	30	32	
,,	c	11	7	9	
,,	d	0	15	7	
Midland Cos.	a	37	37	37	78
,,	b	44	37	41	
,,	c	15	4	9	
,,	d	4	22	13	
England, S.	a	56	41	49	84
,,	b	33	37	35	
,,	c	11	7	9	
,,	d	0	15	7	
Scotland, W.	a	44	48	46	71
,,	b	19	30	25	
,,	c	22	11	16	
,,	d	15	11	13	
England, N.W.	a	45	56	51	78
,,	b	22	33	27	
,,	c	26	4	15	
,,	d	7	7	7	
England, S.W.	a	41	70	56	85
,,	b	37	22	29	
,,	c	19	8	14	
,,	d	3	0	1	
Ireland, N.	a	44	59	52	81
,,	b	26	33	29	
,,	c	19	4	12	
,,	d	11	4	7	
Ireland, S.	a	37	56	47	76
,,	b	30	29	29	
,,	c	22	0	11	
,,	d	11	15	13	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	39	39	39	76
,,	b	29	45	37	
,,	c	32	10	21	
,,	d	0	6	3	
Scotland, E.	a	35	39	37	73
,,	b	26	45	36	
,,	c	29	16	22	
,,	d	10	0	5	
England, N.E.	a	42	48	45	82
,,	b	32	42	37	
,,	c	20	10	15	
,,	d	6	0	3	
England, E.	a	36	52	44	91
,,	b	58	35	47	
,,	c	6	3	4	
,,	d	0	10	5	
Midland Cos.	a	35	45	40	79
,,	b	42	35	39	
,,	c	23	10	16	
,,	d	0	10	5	
England, S.	a	39	55	47	84
,,	b	48	26	37	
,,	c	13	10	12	
,,	d	0	9	4	
Scotland, W.	a	35	39	37	63
,,	b	26	26	26	
,,	c	29	19	24	
,,	d	10	16	13	
England, N.W.	a	42	49	46	75
,,	b	23	35	29	
,,	c	26	10	18	
,,	d	9	6	7	
England, S.W.	a	58	55	57	81
,,	b	23	26	24	
,,	c	6	16	11	
,,	d	13	3	8	
Ireland, N.	a	52	35	44	74
,,	b	16	45	30	
,,	c	23	10	17	
,,	d	9	10	9	
Ireland, S.	a	39	55	47	81
,,	b	32	35	34	
,,	c	16	0	8	
,,	d	13	10	11	

SUMMARY.

British Isles	a	45	53	49	80
,,	b	30	31	31	
,,	c	18	6	12	
,,	d	7	10	8	
British Isles	a	41	47	44	78
,,	b	32	36	34	
,,	c	20	10	15	
,,	d	7	7	7	

Submitted the following :—

List of Storm Warnings issued to the Coasts of the British Islands since the last Meeting of the Meteorological Council, naming the Day and Hour of Issue, the Coasts warned, the Signals hoisted, the Gales experienced (with the approximate time of their occurrence), and the Result, as to the Character of the Warning.

(1.) Warnings issued.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result.* (Character of Warning.)
1887.				
Dec. 14th, 10.10 a.m.	Ireland, S.	South cone	Moderate Wly. gales, evening of 14th.	B
„ „	„ E.†	„	Moderate S.Wly. gales, afterwards veering to N.W., on 14th and 15th.	B
„ „	Scotland, W.†	„	Moderate gale from S., night of 15th.	B
„ „	England, N.W.	„	Moderate to fresh gale S.W. to N.W., evening of 14th and morning of 15th.	A
„ 6.40 p.m.	„ S.	„	Moderate gale from S.W., night of 14th and again on 16th.	B
„ „	„ S.E.	„	„ „ „	B
„ „	„ E. (southern part).	„	Neither gales nor strong winds	C
„ 7.40 p.m.	Scotland, E.	„	„ „ „	C
„ „	England, E. (northern part).	„	„ „ „	C
Dec. 15th, 5.10 p.m.	Scotland, E. (northern part).	South cone	Neither gales nor strong winds	C
„ 7.0 p.m.	„ E. (southern part).	„	Moderate gale from S.W., on 16th	B
„ „	England, W.	„	Moderate to fresh gales S.W. to W., on 16th.	A
„ „	„ S.W.	„	„ „ „	A
Dec. 17th, 9.50 a.m.	Scotland, E. (Dunrossness and Caithness).	North cone	Strong N.Wly. gale, afternoon 17th	A
Dec. 20th, 10.10 a.m.	Scotland, E.	North cone	Strong Nly. winds, on evening of 20th. This warning was issued in consequence of an erroneous entry on the working chart.	B
Dec. 22nd, 10.40 a.m.	Scotland, E. (Dunrossness and Caithness only).	South cone	Neither gales nor strong winds - Barometer was falling fast at Stornoway; Wick reported "bad-looking appearance."	C
1888.				
Jan. 1st, 9.30 a.m.	Ireland, S.	South cone	Neither gales nor strong winds	C
„ „	„ E.	„	„ „ „	C
„ „	England, W. (Bristol Channel).	„	„ „ „	C
„ „	„ S.W.	„	Moderate gale from S.E., evening of 1st. A new depression came in over our N.Wn. districts on following night, and broke up the disturbance the advance of which caused these warnings to be issued.	B

* A = complete success (*i.e.* justified by gales of force 8 or more by Beaufort's scale).
B = partial success („ „ strong winds, forces 6 or 7 „).
C = failure („ not justified by either gales or strong winds).
† Information at present available for these coasts insufficient to give reliable results.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result. (Character of Warning.)
1888.				
Jan. 3rd, 9.50 a.m. -	Ireland, S. - -	South cone	Strong to whole gale S., night of 3rd	A
„ „ -	„ E. -	„	Fresh to strong gale, night of 3rd and on 4th.	A
„ „ -	England, S.W. -	„	Fresh to strong gale, on 4th -	A
„ 10.20 a.m. -	Scotland, W. -	„	Strong Sly. gale, night of 3rd -	A
„ „ -	England, N.W. -	„	Fresh S.Ely. and Sly. gales, on 4th	A
„ „ -	„ W. -	„	„ „ „ -	A
„ Noon -	„ S. -	„	Moderate gales from Swd., on 4th -	B
„ „ -	„ S.E. (mouth of Thames).		Strong Sly. winds, on 4th - -	B
„ 3.30 p.m. -	Scotland, E. -	„	Fresh to strong gales from Swd., on 4th.	A
Jan. 4th, 10.15 a.m. -	England, S.E. (except mouth of Thames).	„	Strong Sly. winds, on evening of 4th.	B
„ „ -	„ E. -	„	„ „ „ -	B
Jan. 5th, 7.30 p.m. -	Ireland, S. -	South cone	Fresh Sly. gale, night of 5th -	A
„ „ -	„ E. -	„	Neither gale nor strong wind -	C
„ „ -	Scotland, W.† -	„	„ „ „ -	C
„ „ -	England, N.W. (northern part).	„	„ „ „ -	C
Jan. 6th, 3 p.m. -	Scotland, E. (northern part).	„	„ „ „ - The depression was well defined, but it kept too far to the Wwd. for its gales to spread to more than the extreme Wn. and N.Wn. stations.	C
Jan. 7th, 7.20 p.m. -	Scotland, E. (Dunrossness and Caithness).	South cone	Neither gale nor strong wind -	C

† Information at present available for these coasts insufficient to give reliable results.

SUMMARY.

A. Complete success - - - - - -	12
B. Partial „ - - - - - -	12
C. Failures (*i.e.* gales not felt on the particular coasts warned) -	13
Total - - -	37
Equivalent percentages:	
A + B - - - - - - - -	65
C - - - - - - - -	35

The values for *Partial success* and for *Failure* will probably be greatly modified when we receive the returns from light vessels and anemometrical stations, especially those for all winds in "Ireland, East," and "Scotland, West;" for South-westerly winds in Scotland, East, and England, East; and for Northerly winds in England, S.W., and England, South.

(2.) GALES FOR WHICH NO WARNING WAS ISSUED.

A Westerly gale (strong in the west of Scotland only) prevailed over the north-western parts of the kingdom early on December 17th. It was caused by a sudden increase of pressure round what had previously been a shallow depression lying off the north of Scotland. The gradients thus became steep, and the wind accordingly increased considerably. There was nothing in the previous evening's reports to lead to the conclusion that such a change would occur.

(Signed) FREDC. GASTER.

Telegraphic Branch,
11th January 1888.

Submitted—The following report:—

HAY HARVEST FORECASTS, 1887.

Meteorological Office, Telegraph Branch,
January 11, 1888.

SIR,

I BEG to submit, herewith, the results of the checking of the Hay Harvest Forecasts issued during the hay-making period of 1887.

The telegrams were transmitted daily between 3.30 p.m. and 4 p.m. on each week day for about five weeks, to 29 different observers, whose names are given in Table II. All of these gentlemen kept the necessary records of "weather," by which the accuracy of the forecasts was checked. The telegrams were sent gratuitously to 28 of the observers, while the other (viz., Mr. Earle, of Edenhurst, near Liverpool) received them at his own expense.

The general percentage of successful forecasts (88) is much larger than that of last year, and larger than that for any of the preceding years since the system was commenced—a result which may be due partly to the quiet character of the weather prevailing at the time, but partly also to the extended area of observation which was inaugurated at the beginning of the year, and which has been of so much value to us in the work of forecasting and warning for storms. The proportion of "complete successes" was as high as 77·8 per cent. at Rothamsted and 67 per cent. at two of the north-western stations, and the increase in accuracy in the forecasts for Ireland and England is very decided. In the east of Scotland the change was in the opposite direction, and I hope, before the next meeting of the Council, to look into this question, in order to detect, if possible, the reason for this falling off in that region. In Table II. will be found notes added by three of the recipients, speaking in high terms of the forecasts.

In addition to the above there were sent similar telegrams to six other gentlemen, at their own cost, whose names have been omitted from the ordinary list, as they did not undertake to furnish any observations for checking the accuracy of the forecasts. From some of these, however, the most satisfactory letters have been received; thus:—

Sir J. Shelley, Shobrooke Park, Crediton, says (Letter 1744/87): "I hope to continue them "next year, and shall then be able to give you a correct return of the weather on your forms." . . . . "I can only say that as far as this season is concerned the telegrams were almost entirely correct."

H. V. Boothby, Esq., Butterby Farm, Alfreton (Letter 1609/87), says: "They have been very useful."

J. Fergusson, Esq., Brettenham Manor, Thetford (Letter 1460/87), says: "I must say the forecasts were most accurate."

I hope these results may prove satisfactory to the Council, as evidence that no effort is being spared to make this most difficult and trying work as valuable as possible.

I am, &c.

(Signed) FREDC. GASTER.

R. H. Scott, Esq.,
Secretary, Meteorological Council.

SUMMARY of RESULTS.

Districts.	Names of Stations.	Percentages.				Total Percentage of Success.
		Complete Success.	Partial Success.	Partial Failure.	Total Failure.	
SCOTLAND, N. - -	Munlochy and Golspie - -	54	38	8	—	92
SCOTLAND, E. - -	North Berwick, Aberfeldy, Glamis, and Grange.	49	26	2	23	75
ENGLAND, N.E. -	Ulceby and Chatton - -	45	39	13	3	84
ENGLAND, E. - -	Rothamsted and Thorpe -	71	22	3	4	93
MIDLAND COUNTIES -	Cirencester and East Retford -	50	30	12	8	80
ENGLAND, S. - -	Horsham, Maidstone, and Downton	66	31	3	—	97
SCOTLAND, W. -	Dumbarton, Stranraer, and Islay	61	33	6	—	94
ENGLAND, N.W. -	Leyburn, Prescot, and Liverpool	56	35	6	3	91
ENGLAND, S.W. -	Bridgend (Glamorgan), Clifton, and Spring Bank (Gloucestershire.)	55	37	8	—	92
IRELAND, N. - -	Hollymount and Moynalty -	52	34	14	—	86
IRELAND, S. - -	Kilkenny, Ardfert, and Moneygall	58	33	9	—	91
	Mean for all districts - -	56	32	8	4	88

HAY HARVEST FORECASTS, 1887.

RETURN showing the NUMBER of FORECASTS sent to each of the under-mentioned PERSONS, with the SUCCESS or otherwise of the FORECASTS.

Districts.	To whom sent.	Address.	No. of Forecasts sent.	No. of Forecasts checked.	Percentages.				Remarks.
					Complete Success.	Partial Success.	Partial Failure.	Total Failure.	
0. SCOTLAND, N.	Major Smith	Munlochy, Inverness	30	30	56·7	43·3	—	—	Major Smith remarked each week that the forecasts were "very satisfactory."
	Rev. Dr. Joass	Golspie	30	30	50·0	33·3	16·7	—	
1. SCOTLAND, E.	W. W. Kerr	Ferrygate, North Berwick	30	12	41·7	16·6	41·7	—	
	C. L. W. Forbes	Aberfeldy	30	30	36·7	43·3	13·3	6·7	
	G. Johnstone	Glamis, by Forfar	30	30	66·7	16·7	13·3	3·3	
	A. F. Leslie	Braco Grange, Banffshire	30	30	50·0	26·7	23·3	—	
2. ENGLAND, N.E.	J. Turner	The Grange, Ulceby	30	30	36·7	46·6	10·0	6·7	Mr. J. Turner says: "I think the "prognostications have been very "true."
	J. Wilson	Chillingham Barns, Chatton, Northumberland.	30	30	53·4	30·0	16·6	—	
3. ENGLAND, E.	Sir J. B. Lawes, Bart.	Rothamsted, Harpenden	30	18	77·8	11·0	5·6	5·6	
	W. Birkbeck	High House, Thorpe, Norwich	30	30	63·4	33·3	—	3·3	
4. MIDLAND COUNTIES	Royal Agricultural College.	Cirencester	30	30	63·4	23·3	3·3	10·0	
	E. E. Harcourt-Vernon	Grove Hall, East Retford	30	30	36·7	36·7	20·0	6·6	The telegrams were "waited for every "day by those who live near enough "to use them." Letter 1715/87.
5. ENGLAND, S.	G. M. Allender	Stammerham, Horsham	30	29	62·1	34·5	3·4	—	
	C. Whitehead	Barming House, Maidstone	30	30	66·7	30·0	3·3	—	
	E. P. Squarey	The Moot, Downton, Wilts	30	29	69·0	27·6	3·4	—	
6. SCOTLAND, W.	W. Calder	Castlehill, Dalreock, Dumbarton	30	30	53·4	43·3	3·3	—	
	M. J. Stewart, M.P.	Ardwell, Stranraer	36	30	66·7	30·0	3·3	—	
	J. S. R. Ballingal	Eallabus House, Islay	30	30	63·3	26·7	10·0	—	
7. ENGLAND, N.W.	G. W. Wray	Leyburn, Yorkshire	30	30	63·4	33·3	3·3	—	
	The Earl of Derby	Knowsley, Prescot	30	30	66·7	26·7	6·6	—	
	F. W. Earle	Edenhurst, Roby, Liverpool	13	11	36·4	45·4	9·1	9·1	
8. ENGLAND, S.W.	Colonel J. B. Turberville	Ewenny Priory, Bridgend, Glamorganshire.	30	30	40·0	53·3	6·7	—	
	T. Dyke	Long Ashton, Clifton, Bristol	18	18	61·1	33·3	5·6	—	
	The Earl of Ducie	Spring Park, Gloucestershire	18	17	64·7	23·5	11·8	—	
9. IRELAND, N.	Rev. A. Brown	The Manse, Hollymount, Co. Mayo	30	18	50·0	38·9	11·1	—	
	E. F. Farrell	Moynalty, Kells, Co. Meath	30	30	53·3	30·0	16·7	—	
10. IRELAND, S.	D. A. Millward	Lavistown, Kilkenny	30	30	63·3	30·0	6·7	—	
	W. Talbot Crosbie, D.L.	Ardfert Abbey, Tralee	30	30	50·0	40·0	10·0	—	
	D. A. M'Cready	Larchvale, Moneygall	30	30	60·0	30·0	10·0	—	

Submitted—The following statements of work during December 1887:—

MARINE ROOM.

January 10, 1888.

Examined 10 new logs and 1 lighthouse register.

North Atlantic Weather Charts.

Forwarded to the lithographer sheets to July 26, 1883. Proofs of lithographed charts to June 17 received, and to May 30 passed for press.

Reducing by eidograph the additional charts for September 1–3, 1883, and preparing remainder of charts for lithography.

Tracking low-pressure systems for August 1882.

General.

Charting observations for the discussion of Arabian Sea and Gulf of Aden cyclones in May and June 1885.

Discussion of M.O. and Admiralty Red Sea charts.

Drawing a form of chart for representing Meldrum's South Indian Ocean cyclone tracks.

Supplying the Solicitor to the Board of Trade with extracts from logs of ships in the Gulf of Mexico and in the neighbourhood of the West Indies during August and September 1886; also with ice observations in the North Atlantic in June and July 1887.

Indexing data in ocean 10-degree squares.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE.

TELEGRAPHIC (FORECAST AND STORM WARNING) DEPARTMENT.

(To 31st December 1887.)

Monthly Weather Report, 1887:—

January.—In print.

February.—Quite ready for printer.

March.—About half done.

April to October.—Advanced slightly from condition at last report.

November.—Charts, tables, &c. prepared.

December.—Well in hand.

Progress with these has been stopped for past 18 days by order of Secretary.

Weekly Weather Report, 1887.—Issued promptly to date, and all Appendices well up to date.

Daily Weather Report.—Issued promptly to date. Corrections and editions, with monthly summary for November, issued. New averages of pressure and temperature are now ready for use in the reports for 1888.

Checking of Storm Warnings issued.—Done to date. Report to 11th January 1888 herewith.

Checking of Daily (3.30 p.m. and 8.30 p.m.) *Forecasts.*—Done to date.

Plotting of Daily Telegrams from United States.—Done to date. All necessary notices resulting therefrom sent to Lloyd's.

Checking of Hay Harvest Forecasts, 1887.—Completed.

(Signed) FREDC. GASTER.

The Christmas holidays have been taken during this month, retarding work somewhat.

PANTAGRAPH ROOM.

January 1, 1888.

Observatory Returns.—The calculation of the various means for May 1885, and the copying of the hourly values for that month completed, and the "copy" sent to printer. The means for June 1885 are now being worked.

Harmonic Analyser.—The analysis of the barograms for the year 1878 has been carried as far as Stonyhurst, the curves for which observatory are now in hand.

Miscellaneous.—Nearly the whole of my own and Mr. Thompson's time has been occupied upon the proofs of the "Report of the Krakatoa Committee," in connexion with which a great many corrections and emendations have been made.

(Signed) R. H. CURTIS.

R. H. Scott, Esq., F.R.S.

EXAMINATION BRANCH.

December 31, 1887.

Examinations.

November 1885.—Completed.

December 1885.—Completed.

October to November 1887.—Partially examination of the Valencia work for the Registrar General of Ireland.

Weekly examination (on receipt) of curves and documents from all stations.

Reports, &c.

November 1885.—*Notes of Errors* to Aberdeen, Armagh (anemograms), Falmouth, Kew (anemograms), and Valencia, and report thereon to Council.

Re suggested unprinted rain curves by Mr. Whipple.

(Signed) T. E. ALLEN.

Submitted—The following report:—

I HAVE the honour to submit the following report of the stations inspected by me this year:—

TELEGRAPHIC REPORTING STATIONS.

Dungeness, inspected June 18th.—There continue to be occasional errors in the barometric reports from this station, due, as I think, to inaccuracy on the part of some of the observers. As I have previously reported, the readings are taken by the light-keepers in rotation as they are on duty. All the instruments were found to be in good order, and the thermometers read well together. The low temperatures occasionally reported from this station, as compared with temperatures reported from stations at no great distance on the coast, are, as I feel convinced, correct. The estimated wind-force in gales, as reported from this station, appears somewhat low; but I venture to question whether it is incorrect. I consider that there is a slight tendency at nearly all our inland and east coast stations, to over-estimate the wind-force; and it may be observed in this connexion that the observer, Mr. P. Curnow, who is responsible for the wind reports at Dungeness, has spent the greater part of his life on the Cornish coast. The direction of the wind does not always seem to be reported with exact accuracy from this station. It was correctly estimated by the observers on the day of my visit; but I noticed what I have observed with surprise of light-keepers at many other localities, that they estimated with hesitation and inaccuracy the compass direction of various objects on the horizon. The reports from this useful station will, I think, improve.

Jersey, June 21st and 22nd.—The observer, Mr. Fisher, had recently been appointed station-master at the railway station of St. Aubins, and had therefore removed one of the barometers from his house at Noirmont to the booking office at the terminus. The thermometer screen was also removed from Noirmont to a small piece of ground adjoining the railway station, of which I have sent a plan to the Meteorological Office. The barometer now in use, No. 531, is that which was formerly used as the check barometer at Noirmont: the height of the cistern above mean sea level I estimate as 25 feet. I recommend that this barometer should be moved from the booking office into a waiting-room which is little used and is visible from the office. In its present position it will in winter be in too close proximity to a gas stove. No fire is ever lighted in the waiting-room. The 8 a.m. readings of the barometer were at the date of inspection still taken at Noirmont. The thermometer screen has a pretty fair exposure. The change of altitude will necessarily cause the summer maxima to be somewhat higher than those previously reported from Noirmont. It can scarcely be said that any thermometer screens in the south of England stood over grass at the time of my inspections, the grass having been destroyed by drought.

Hurst Point, June 24th.—I found all the instruments at this station in excellent order, and the observer, Mr. Appleton, certainly improves to some extent in care and accuracy. It must however be admitted, that as regards correctness in taking the bearings of distant objects, the remarks made for Dungeness apply to the observers here also. Sea disturbance can never be exactly estimated from this point.

Prawle Point, June 26th.—A new observer, Mr. Hewitt, has been appointed at this station. He is a man of intelligence, and takes the observations with much accuracy; while his assistant, Mr. Mehegan, is (as mentioned in last year's report) a very efficient observer. All the instruments, excepting the minimum thermometer, were in excellent order. The minimum, No. 307, contained ·9 of detached spirit, and, for the first time in my experience, I failed to restore this. I gave the necessary instructions to the observer as to the method of doing this, and requested him in the meantime to make the necessary correction. The rain gauge had been torn away from its supports and partially injured a few days before my visit, during rainless weather, by the fall of one of the stays of the flagstaff. I had this remedied during my visit. I think that the reports from this station, as regards wind, weather, and sea disturbance, are as good as can be obtained from any point on our south coast.

Scilly (*St. Mary's*), June 28 and 29.—The observations at this station continue to be well conducted, although the observer, Mr. Thomas, is somewhat aged. His son occasionally assists in taking observations, but my opinion is that a most efficient substitute will be found in Mr. Alfred Hicks (strongly recommended by Mr. Smith Dorrien), whom I carefully examined in the knowledge of meteorological instruments, and who at any time could undertake the work, should the health of Mr. Thomas break down.

The barometers and thermometers read fairly well together, but the maximum on this occasion read 0·6 too high. Since last year some more of the louvre work of the door of the screen has gone to pieces, and I ordered that the door should be taken off (being temporarily replaced by perforated canvas), and completely repaired; that the whole screen should be repainted, and the cap should be repaired. Repairs were also required for the block holding the rain gauge, which I ordered to be done at once. The moisture conveyed by the atmosphere over these islands contains a remarkable amount of salt, one of the results of which is that the velocity-trace of the anemograph is frequently dim, especially about midnight, and the paper is blurred with a yellow tint.

I had undertaken to fix a new brush for the anemometer, but this had not arrived at the time of my visit.

It appears as though the estimated wind-forces reported from this station are, in the cases of strong breezes and gales, somewhat too high. It is impossible for me without carefully comparing the estimated forces with the anemographs to pronounce an opinion on this subject, but it is certain that the force of the wind in gales, as felt at Scilly, appears extraordinary to those who are not accustomed to it.

Loughborough, August 25th.—I found all the instruments at this station in excellent order, and the observations are carried on, as usual, with the utmost accuracy.

Barrow-in-Furness, September 3rd.—The instruments at this station were in fairly good order. The higher wind-forces appear to be somewhat over-estimated, but the observer's house has a very bleak exposure to Westerly winds. As regards the direction of the winds, I have previously called attention to the diversion of Southerly air currents on this coast as explained by orographical considerations. The barometer is in good order, yet the readings reported appear not uncommonly to be too low.

North Shields, September 6th.—The observations at this station continue to be carefully carried on, and the instruments are in fairly good order, with the exception of the rain-gauge. The latter instrument is nearly worn out. The large anemometer, erected since the last inspection on the Dockwray Square Lighthouse, works well, but the clock has not always been accurately regulated. The results of the comparisons between the estimated wind-forces and the indications of the small hand-anemometer have been satisfactory at this station, but as the latter observations have to be taken at some distance from the post office, the official duties of Mr. Irvine prevented his continuing them. I have asked Mr. J. Foster Spence to take for some time the readings of the hand-anemometer on his lawn (which is the place at which they have hitherto been taken), independently of, but simultaneously with, the estimations taken by Mr. Irvine in Dockwray Square. The results will be sent to the Meteorological Office.

York, September 7th and 8th.—Although the barometer readings from this station occasionally appear too high, the observer seems to read with complete accuracy, and I can find no fault with the barometer. The absence of reported strong winds or gales from this station is somewhat remarkable, but that gales are practically almost unknown in York is a statement confirmed, so far as my inquiries have gone, by independent evidence.

Cambridge, September 20th.—The observer was absent at the time of my visit. All the instruments were in very good order. The wind-forces reported from this station are, I believe, still deduced from the readings of the anemometer, and the instrument is considerably sheltered by trees on all sides of the observatory, and to some extent by the dome of the observatory itself. It is, I think, partly in consequence of this fact that the wind-forces reported seem to be almost always too low. It is, however, quite possible that the mean velocity of the wind over this district may be actually low. Every careful observer who has studied the effects of wind on trees, &c. in localities apparently similar must have been struck by the magnitude of the difference in these effects, and by the difficulty of accounting for this magnitude.

Yarmouth, September 21st.—The reports from this station continue to be good. The self-registering aneroid works well, but has not been adjusted as frequently as it ought to have been. The anemometer, barometers, and thermometers are all in good order.

STATIONS OF THE SECOND ORDER, and those supplying WEEKLY REPORTS only.

St. Leonards.—I inspected this station on June 20th. All the instruments were found to be in good order, and to be thoroughly well attended to. Some imperfections were noted in the returns from this station in the winter and early spring of this year, and the later returns of this year are not very satisfactory. It is not possible to obtain the services of a deputy for the 9 p.m. obser-

vations, and the observer is now and then obliged in very cold weather, such as we experienced last winter, to omit these observations.

The sunshine recorder is well placed, and is most carefully attended to by the reservoir keeper.

Helston, June 27th.—The observer at this station, Mr. Gill, had now for more than three years neglected to send any returns, although he has every year, at the time of my visit, promised to forward them within a short space of time. I this year took upon myself to inform him that unless the arrears for the latter part of the year 1883, and the whole returns of 1887 up to date, were sent in within one month, the station would probably be altogether dropped. It should be remarked that I found the reports for 1887 pretty fairly complete. Those for the previous three years were not to be found at the date of my visit.

Letters have on various occasions been sent to the observer, and the Meteorological Office has undertaken to perform the reductions for him. I now recommend that this station be altogether dropped.

Leicester, August 25th.—The instruments at this station were in tolerably good order, with the exception of a new grass minimum, which has an error of $-4^{\circ} \cdot 5$. The observer is by no means accurate in taking readings of the instruments, especially of the barometer, and I see no prospect of improvement. The error in the hygrometrical reductions was again pointed out to the observer.

Sheffield, August 26th.—It will still be impossible to obtain 9 p.m. readings at this station, unless the Meteorological Council see fit to pay about 1s. a week to the gardener. Mr. Howarth already bears (as I understand) the expense of the Sunday observations. The observations are admirably conducted, although a certain number of errors occurred during the absence of Mr. Howarth, the curator of the Museum, in the spring of this year. The outdoor instruments have been moved about 21 yards from their former position, owing to the completion of the Art Gallery. The exposure is good, but the screen is painted green.

Prestwich, August 26th.—The observer, Dr. Clunn, being absent at the time of my visit, and having the keys of the outdoor instruments, I was unable to obtain access to the thermometer screen and rain gauge. No comparisons, therefore, could be made. The barometer has been moved to the site which it occupied before 1885. The instrument is in good order. The returns from this station are now very good.

Douglas (*Prospect Hill*), August 31st and September 1st.—A new site has been obtained for the thermometric observations at this station, on the grounds upon which stands the Roman Catholic Church of St. Mary's, at an elevation of a few feet above the previous position on the roof of the observer's house. I would now retract the recommendation which I made last year that the observations from this place should not be published. Little exception can now be taken to the position of the thermometers, although the screen is by no means entirely unsheltered. The rain-gauge still occupied an undesirable position on the roof of Mr. Keig's house, and I recommended that it should be removed to a position which I have marked out for it on the lawn in which the screen is placed. At this spot its exposure will not be perfect, but will be, I think, more satisfactory than in its former situation. I have sent to the Office a plan of the locality of the outdoor instruments. The barometer, though not very incorrect, is not a good instrument; and the observer will be glad to obtain, through the Meteorological Office, one of Adie's non-contracted barometers. This station possesses conditions of permanence which will probably render it a valuable one, and both the observer and his son-in-law, who assists in taking the observations, are careful and painstaking.

Douglas (*Cronkbourne*), inspected September 1st.—The returns from this station continue to be very complete, and I found all the instruments in good order. The observer, Mr. A. Moore, no longer resides in Cronkbourne, but visits the instruments daily, and his assistant takes the observations accurately.

Hawes Junction, September 5th.—Since this station was last inspected there has been a change of observers, and the new railway station master, Mr. W. H. Bunce, appears to take the observations with great care and accuracy. All the instruments were in excellent condition, but the barometer, when corrected for index error, read (at $28 \cdot 2$) somewhat low.

Felton, Northumberland, September 6th.—I very carefully inspected this station, and was of opinion that, although the observer is painstaking, the advisability of publishing the returns was very questionable.

Seaham, September 7th.—Mr. Aird was ill at the date of my visit, and I was unable to have an interview with him. The readings of the outdoor instruments are taken by Mr. Leith, at the Cemetery Grounds, who is a most acute and accurate observer. The instruments are all in good order, but in the hygrometrical results mistakes still occasionally occur.

Durham, September 7th.—Mr. Carpenter was absent on the day of my visit. The temporary substitute took the readings of the instruments most accurately. Everything was in excellent order at this station, and the returns are very careful and complete. The grass minimum reads very low.

York, September 8th.—The observations at this station are now very carefully taken, and the observer reads the instruments with great accuracy. It might perhaps be well if a new rain-gauge were supplied, as it is somewhat inconvenient to employ the same instrument for the 8 a.m. and 9 a.m. readings. I am still of opinion that the meagre report of bright sunshine from this station is due to an unusual amount of haze produced by smoke.

Bawtry, Hesley Hall, September 9th.—Owing to the rebuilding of the observer's house, all the instruments have been shifted since the last inspection. The outdoor instruments have a very fair exposure on a lawn on the north-west side of the house. I have sent a plan of their present position to the Meteorological Office. The barometer is extraordinarily sluggish, but I ascertained that it contained no air. I requested the observer to have a guard made for the cistern of the barometer, without which the instrument is sure to receive injury. The observations at this station are fairly good.

Market Rasen, September 10th.—This is a new station, of which I have sent a scale plan. The instruments are thoroughly good, excepting that the maximum at all temperatures between 52 and 82 inclusive, reads about ·9 too high, whereas the correction hitherto applied is +·2. I have requested the observer to compare the thermometers in melting ice, and meanwhile to apply a correction of —·9. The rain-gauge has hitherto been situated in the vicarage gardens, where it is very seriously sheltered by the house. I marked out a new and good site for it on the observer's lawn. Mr. Jevons appears to me to be very careful and accurate, and I highly recommend the station. The country round is nearly level, but the land on which the town is situated slopes downward slightly towards the north.

Geldeston, September 27th.—The observer was absent at the time of my visit. The returns from this station are most excellent. All the instruments were in admirable order, except that the thermograph, which had been sent to Paris for repairs, had been roughly treated in the custom-house on its return. I adjusted it as well as I could.

Ingatestone, September 22nd.—This new Weekly Weather Reporting Station is a very promising one. The outdoor instruments, of the site of which we have a photograph, are well exposed and in very good order. The cistern of the barometer is 246 feet above mean sea level. The ground slopes gently down towards the S.E. The district is somewhat thickly wooded, especially to the northward of the observer's house. The set of instruments comprises a Stevenson's screen, fully equipped with thermometers, a high mast with vane, an anemometer, rain gauges, a Jordan's sunshine recorder, and a grass minimum and grass maximum, together with a black bulb in vacuo.

Eastbourne, September 23rd.—This new station is a very good one indeed. The instruments, which are all of the best description, are situated in different parts of the town; but the observer, who has had several years experience, attends to them most carefully. He has also a good deputy. The barometer is in a parade shelter close to the sea, and its cistern is 33 feet above mean sea level. The rain-gauge is situated on a triangular lawn at some distance from this place. It has a very fair exposure. The screen is on a public lawn near the Grand Hotel, and is perfectly exposed. The anemometer is upon a martello between this and the sea. The sunshine recorder is fixed on the highest part of the roof of the Grand Hotel. It required a slight adjustment. It is sheltered for a short period at present at 3 p.m. by an iron rod. The probability that the observations will be permanently kept up is an important consideration in favour of this station.

Epsom, September 24th.—There have been some errors in the readings of the instruments at this station, and occasionally in the reductions, but there is every prospect of improvement. It is desirable that the barometer should be moved to the observer's new rooms where the altitude of the cistern will be 12 feet above the present height. I think that strong winds have hitherto been somewhat over-estimated at this station.

(Signed) W. CLEMENT LEY.

Barometer and Thermometer Readings.

NAME OF STATION.	BAROMETER.			THERMOMETER.										General Condition.	NAME OF STATION.
					Dry Bulb.		Wet Bulb.		Maximum.		Minimum.		Spare or Grass.		
	Difference of Reporting from Inspector's Barometer.	Difference of Check from Inspector's Barometer.	Difference of Observer's from Inspector's Readings.	Temperature in Water.	Correction to reduce to Inspector's Standard.	Correction hitherto applied.	Correction to reduce to Inspector's Standard.	Correction hitherto applied.	Correction to reduce to Inspector's Standard.	Correction hitherto applied.	Correction to reduce to Inspector's Standard.	Correction hitherto applied.	Correction to reduce to Inspector's Standard.		
Dungeness	+ ·002	·000	+ ·002	58·4	0·0	—	+0·1	—	0·0	—	−0·1	—	—	B	*Dungeness.*
St. Leonards	+ ·002	—	·000	65·9	−0·3	−0·4	−0·3	−0·4	+0·1	0·0	+0·1	0·0	—	A	St. Leonards.
Jersey	+0·002	+ ·001	·000	61·2	0·0	0·0	−0·3	0·0	+0·1	0·0	+0·2	0·0	—	A	*Jersey.*
Hurst Point	+ ·003	+ ·001	·000	63	−0·1	0·0	0·0	0·0	0·0	0·0	+0·1	0·0	—	A	*Hurst Point.*
Prawle Point	− ·002	− ·003	− ·002	55	+0·1	0·0	0·0	0·0	−0·4	0·0	−1·1	0·0	−0·1	A	*Prawle Point.*
Helston	− ·005	—	·000	62·9	−0·1	0·0	−0·2	0·0	−0·2	0·0	+0·7	+0·5	—	B	Helston.
Scilly	− ·016	− ·014	− ·004	65·1	−0·1	0·0	+0·1	0·0	−0·6	0·0	+0·1	0·0	0·0	A	*Scilly.*
Leicester	—	—	− ·023	60·9	+ ·1	—	+ ·2	—	+ ·4	—	+ ·8	—	+4·5	B	Leicester.
Loughborough	—	—	·000	61·2	+ ·1	—	0·0	—	+ ·1	—	+ ·2	—	—	A	*Loughborough.*
Sheffield	—	—	− ·002	60·6	0·0	0·0	− ·1	− ·1	+ ·1	0·0	+ ·1	− ·1	—	A	Sheffield.
Prestwich	− ·005	—	—	—	—	− ·3	—	− ·2	—	− ·4	—.	− ·2	—	A	Prestwich.
Douglas (Prospect Hill)	+ ·009	—	+ ·002	64·6	0·0	0·0	0·0	0·0	0·0	− ·3	+ ·4	− ·2	—	B	Douglas (Prospect Hill).
„ (Cronkbourne)	− ·003	—	+ ·002	59·7	− ·1	—	0·0	—	+ ·1	—	+ ·6	—	—	A	„ (Cronkbourne).
Barrow-in-Furness	− ·006	—	0·0	60·8	− ·3	− ·4	− ·3	− ·3	− ·1	− ·1	0·0	− ·1	—	A	*Barrow-in-Furness.*
Hawes Junction	+ ·004	—	0·0	52·9	0·0	—	− ·1	—	0·0	—	0·0	—	0·0	A	Hawes Junction.
Felton	—	—	—	58·6	− ·1	—	− ·2	—	−1·3	− ·1	− ·1	—	—	C	Felton.
North Shields	− ·015	− ·001	0·0	58·6	+ ·8	—	+ ·5	—	0·0	—	+1·6	—	+ ·6	A	*North Shields.*
Seaham	—	—	—	55·5	− ·1	—	− ·1	—	+ ·7	—	+ ·6	—	—	A	Seaham.
Durham	—	—	0·0	53·4	0·0	—	+ ·1	—	+ ·1	—	+ ·6	+ ·4	+1·1	A	Durham.
York	0·0	—	0·0	57·1	+ ·1	—	+ ·1	—	+ ·3	—	+1·2	—	—	A	York.
York	0·0	—	0·0	57·1	+ ·1	—	+ ·1	—	+ ·1	—	+1·0	—	—	A	*York.*
Bawtry	—	—	—	56·1	− ·6	—	0·0	—	0·0	—	+ ·2	—	—	A	Bawtry.
Market Rasen	− ·011	—	0·0	54·9	0·0	− ·1	0·0	− ·1	− ·9	+ ·2	+ ·1	—	− ·1	A	Market Rasen.
Cambridge	+ ·003	—	—	53·4	0·0	—	−0·1	—	− ·2	—	0·0	—	—	A	*Cambridge.*
Yarmouth	+ ·013	− ·004	+ ·001	57·5	+0·3	—	+0·1	—	0·0	—	+0·3	—	—	A	*Yarmouth.*
Geldeston	·000	—	—	56·4	0·0	0·0	−0·1	−0·1	0·0	−0·3	+0·1	−0·1	—	A	Geldeston.
Ingatestone	− ·016	—	·000	58·3	0·0	0·0	0·0	0·0	0·0	0·0	+0·4	+0·4	+0·2	A	Ingatestone.
Eastbourne	− ·016	—	− ·001	56·3	0·0	0·0	+ ·1	0·0	+ ·1	0·0	+ ·1	0·0	—	A	Eastbourne.
Epsom	+ ·001	—	·000	55·0	0·0	− ·1	+0·1	0·0	+ ·2	0·0	0·0	0·0	—	B	Epsom.

Submitted—The following Statement respecting the Records for December 1885, received from the Self-recording Observatories (see Minutes, 21st December 1868, 20th November 1876, and 3rd January 1883) :—

December 1885.	Aberdeen.		Armagh.		Falmouth.		Kew.		Valencia.	
ANEMOGRAPH :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity
Action of Instrument - - -	Good.	Good.	Good.	†Indiff.	§Good.	§Good.	Good.	Good.	Good.	Good.
Records deficient :—										
Due to stoppage of clock - - -	12 hrs.	14 hrs.	0	0	0	0	0	0	3 hrs.	4 hrs.
„ other causes - - -	0	0	0	0	0	0	0	‖1 hr.	0	0
Number of errors discovered :—										
By general examination - - -	0	(*a*)	0	2	0	0	0	5	0	2
Results of 40 re-measurements :—										
Greatest difference - -	1·0	2·0	0·0	1·0	1·0	1·0	1·0	1·0	1·0	2·0
Mean difference irrespective of sign -	0·0	0·7	0·0	0·4	0·1	0·5	0·0	0·4	0·1	0·7
Residual difference (—Meteorological Office)	0·0	+0·1	0·0	+0·2	+0·1	0·0	0·0	0·0	+0·1	0·0
Orientation verified - - - -	30th	—	—	—	15th	—	4th	—	28th	—
RAIN GAUGE :—										
Action of Instrument - - -	*Good.		Good.		*Indifferent.‡		¶Indifferent.		Good.	
Records deficient :—										
Due to stoppage of clock - - -	0		0		0		0		0	
„ other causes - - -	0		0		0		0		0	
Number of errors discovered :—										
By general examination - - -	0		0		0		1		0	

——	Aberdeen.		Falmouth.		Kew.		Valencia.	
BAROGRAPH :—								
Action of Instrument - - -	Good.		Good.		Good.		‡Good.	
Character of Photography - -	Bad.		Do.		Do.		Fair.	
Records deficient :—								
Due to stoppage of clock - - -	0		0		0		0	
„ failure of light - - -	0		0		0		0	
„ other causes - - -	0		0		††4 hrs.		‡‡5 hrs.	
Number of errors discovered - - -								
In entry of standards - - -	**—		5		1		0	
„ calculating residuals - - -	—		2		0		0	
„ applying „ - - -	—		0		23		1	
By general examination - - -	—		3		§§49		19	
Results of 40 re-measurements :—								
Greatest difference - - -	—		·009		·007		·011	
Mean difference irrespective of sign -	—		·004		·002		·004	
Residual difference (—Meteorological Office)	—		—·001		·000		·000	
Mean monthly difference between simultaneous Barograph and Standard Barometer readings - - - - -	—		·002		·002		·001	
THERMOGRAPH :—								
Action of Instrument - - -	Good.		Good.		Good.		‡Good.	
Character of Photography - -	Fair.		Do.		Do.		Fair.	
Records deficient :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Due to stoppage of clock - - -	0	0	0	0	0	0	0	0
„ failure of light - - -	0	0	0	0	0	0	0	0
„ imperfectly moistened bulbs -	—	0	—	0	—	0	—	0
„ partially frozen bulbs - -	—	21 hrs.	—	19 hrs.	—	40 hrs.	—	0
„ other causes - - -	0	0	0	0	0	0	‡‡1 hr. ¶¶6 hrs.	0
Number of errors discovered :—								
In entry of standards - - -	3	3	2	5	1	0	0	0
„ maxima and minima - - -	0	—	0	—	0	—	0	—
By general examination - - -	0	0	0	0	0	0	0	0
Results of 40 re-measurements :—								
Greatest difference - - -	0·2	0·3	|||—	0·3	0·3	0·3	0·3	0·3
Mean difference irrespective of sign -	0·1	0·2	—	0·1	0·1	0·1	0·2	0·1
Residual difference (—Meteorological Office)	−0·1	+0·2	—	0·0	0·0	0·0	+0·1	+0·1
Mean monthly difference between simultaneous Thermograph and Standard Thermometer readings - - - - -	0·2	0·2	0·1	0·1	0·1	0·1	0·2	0·2

(*a*) Tabulated values entered very irregularly. * Traces faint. † Trace intermittent in low velocities.
§ Pricker bent, traces marking 10m. late. ‡ Curves badly attached. ‖ Examining instrument.
¶ Imperfect action of pencil. ** The standards have had to be rejected throughout, owing to the slipping of the attached thermometer and consequent doubt as to correction for temperatures. †† Face of curve damaged.
§§ Omission of inches at change. ‡‡ Photographic imperfections. ||| Tabulated at the Meteorological Office.
¶¶ Lamp glass smoked.

Reported—That the following cheques had been drawn during December 1887 :—

			£	s.	d.
Dec.	3rd.	J. S. Harding, jun., for payment of weekly salaries -	16	0	0
„	6th.	Paris M. O., telegrams* - - - - -	4	5	4
„	10th.	J. S. Harding, jun., for payment of weekly salaries -	16	0	0
„	14th.	J. A Curtis, for payment of accounts for reduction of old observations - - - - -	20	3	3
„	„	Kew Committee, researches and experiments - -	50	14	1
„	„	R. Jenkin, thermometer screen - - - -	2	0	0
„	„	R. Meteorological Society, observations - - -	60	8	8
„	„	L. P. Casella, instruments - - - -	9	0	0
„	17th.	J. S. Harding, jun., for payment of weekly salaries -	16	0	0
„	24th.	„ „ -	16	0	0
„	29th.	Paris M. O., U. S. telegrams* - - - -	16	6	5
„	31st.	R. H. Scott, Secretary - - - - -	66	13	4
„	„	J. S. Harding, jun. - } Office salaries - - -	27	15	6
„	„	T. D. Bell - - }	15	16	8
„	„	J. Sheerman, salary (harmonic analysis) - - -	10	16	8
„	„	J. E. Cullum, salary (Valencia Observatory) - -	18	15	0
„	„	R. H. Curtis - }	22	18	4
„	„	J. A. Curtis - -	18	6	8
„	„	T. E. Allen - -	16	13	4
„	„	C. H. Thompson - } Salaries (discussion, &c. of observations).	12	10	0
„	„	S. Call - -	11	13	4
„	„	R. G. Canham -	7	10	0
„	„	A. H. Bell - - }	7	10	0
„	„	F. Gaster - - }	25	15	7
„	„	F. J. Brodie -	18	5	7
„	„	G. G. Francis -	17	16	3
„	„	A. J. Rigby - } Salaries (preparation, &c. of weather reports).	17	6	10
„	„	R. Sargeant -	12	3	9
„	„	A. R. Simpkins -	10	6	3
„	„	C. W. Heinemann - }	5	0	0
„	„	Capt. H. Toynbee - }	33	6	8
„	„	Nav.-Lt. C. W. Baillie, R.N. - -	22	18	4
„	„	R. Strachan - -	27	15	6
„	„	C. Harding - - Salaries (discussion, &c. of observations and care of instruments).	22	18	4
„	„	H. Harries - -	15	0	0
„	„	W. Allingham -	15	0	0
„	„	W. G. James -	11	5	0
„	„	F. T. Bullen - -	9	3	4
„	„	R. F. Wallace - }	8	15	0
„	„	G. J. Mayhew, rent - - - - -	158	15	0
„	„	J. S. Harding, senr., pension - - - -	10	14	1
„	„	H. Williams, care of bridled anemometer - - -	2 10 10		
„	„	„ care of Robinson's anemometer - - - -	2 18 10		
				5	9	8
„	„	C. Niven, Aberdeen observatory - -	67 9 11		
„	„	J. L. E. Dreyer, Armagh - -	12 10 0		
„	„	W. L. Fox, Falmouth - - -	61 19 6		
„	„	Fleetwood Improvement Commissioners -	2 10 9		
„	„	R. Grant, Glasgow - - -	19 4 6		
„	„	Kew Committee, allowance - -	100 0 0		
„	„	W. Harrison, North Shields - -	3 1 10		
„	„	W. I. Fortescue, Orkney - -	2 10 0		
„	„	S. J. Perry, Stonyhurst - - -	15 4 0		
„	„	J. O'Driscoll, Valencia (rent) - -	25 0 6		
			309	11	0
		Carried forward - -	£1,221	2	9

* Paid by cheque on a foreign banker.

			£	s.	d.	£	s.	d.
1887.		Brought forward -	-		-	1,221	2	9
Dec. 31st.		G. T. Watson, care of Yarmouth anemometer - - -	3	19	7			
„	„	„ meteorological reports* -	7	12	4			
						11	11	11
„	„	J. McCormack, Aberdeen* - -	3	3	0			
„	„	J. W. Mayes, Ardrossan* - -	3	3	0			
„	„	M. J. Tolan, Belmullet* - - -	3	3	0			
„	„	H. Todd, Cambridge* - - -	7	19	10			
„	„	H. Mohn, Christiania - - -	5	10	0			
„	„	T. Macgowan, Donaghadee* - -	3	3	0			
„	„	P. Curnow, Dungeness* - - -	7	16	7			
„	„	W. Edmonds „ - - -	2	12	0			
„	„	W. Brand, Dunrossness* - -	7	1	9			
„	„	H. W. Bunce, Hawes Junction† - -	3	10	9			
„	„	S. Richards, Holyhead* - - -	7	2	8			
„	„	G. G. Appleton, Hurst Castle* - -	7	1	5			
„	„	J. Fisher, Jersey* - - -	7	6	0			
„	„	W. Hay, Leith* - - - -	3	3	0			
„	„	F. Gaster, London* - - -	7	1	0			
„	„	W. Berridge, Loughborough* - -	6	8	9			
„	„	Lloyd's, for Malin Head - - -	4	7	6			
„	„	K. Kerr, Mullaghmore* - - -	8	8	9			
„	„	A. Penny, Nairn* - - -	7	8	4			
„	„	J. W. Irvine, North Shields* - -	3	3	0			
„	„	W. Wickham, Oxford* - - -	6	15	6			
„	„	O. Boeddicker, Parsonstown - -	3	5	0			
„	„	W. Hewitt, Prawle Point - -	3	5	0			
„	„	W. Kennedy, Roche's Point* - -	3	3	0			
„	„	S. Blake, St. Ann's Head* - -	6	9	6			
„	„	W. Thomas, Scilly* - - -	9	18	8			
„	„	J. B. Smith, Spurn Head* - -	6	8	6			
„	„	J. Forbes, Stornoway - - -	6	0	6			
„	„	J. Sinclair, Wick* - - -	6	8	0			
„	„	F. Guy, York - - - -	3	18	0			
						164	5	0
„	„	Postmaster-General, telegrams - -	-		-	178	18	11
„	„	A. Buchan, salary - - -	-		-	37	10	0
„	„	J. R. Jones, Aberdeen agent - -	2	5	7			
„	„	J. Fowler, Cardiff agent - - -	1	5	6			
„	„	L. Allen, Dundee agent - - -	3	16	9			
„	„	J. Gill, Liverpool agent - - -	12	3	7			
„	„	Z. Scaping, Hull agent - - -	2	8	9			
„	„	D. McGregor & Co., Glasgow agents -	13	4	9			
						35	4	11
„	„	R. Strachan, Arctic work (Minutes, 16th November) -				63	0	0
„	„	F. Gaster, for payment of allowances for late evening and Sunday attendance - - - -				15	15	9
„	„	J. S. Harding, jun., petty cash - - - -				40	0	0
„	„	„ for payment of weekly salaries -				16	0	0
						£1,783	9	3

* Bonus of 3*l.* 3*s.* allowed.
† Bonus of 1*l.* 11*s.* 6*d.* allowed (half rate).

116, *Victoria Street, January* 25, 1888.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.	MR. STONE.
PROFESSOR DARWIN.	THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (January 11) were read and confirmed.

In reply to M. Mascart's letter (Minutes, p. 102), Mr. Scott was instructed to reply that unless M. Mascart can satisfy the Council more completely of the practical utility of the Atlantic telegrams, the Council would consider that it will not be possible to continue to share the expense after April 1st next. (P.C. 223.)

Read.—The following letter (Minutes, 1886, p. 126):—

(M.O. 214.)

MON CHER COLLÈGUE, Paris, le 23 Janvier 1888.

BIEN que je n'aie pas encore reçu toutes les réponses que j'attendais à la circulaire du 1er Juin 1887 accompagnant le "Plan définitif" des "Tables Internationales," je puis dès à présent vous annoncer que, grâce aux souscriptions déjà recueillies, les frais de calcul sont couverts et la vente d'un nombre suffisant d'exemplaires assurée.

Dans ces conditions, je fais pousser activement le calcul des "Tables" dont les trois premiers chapitres sont terminés. Ils seront mis à l'impression au commencement de Février.

J'ai l'intention, les premières feuilles tirées, de vous en envoyer une à titre de spécimen.

Je serais heureux que, à défaut de votre adhésion formelle, vous vouliez bien me faire pressentir, à titre de renseignement, les débouchés probables que trouveront les "Tables Internationales" auprès des savants et des Institutions Scientifiques de votre pays.

Veuillez agréer, mon cher collègue, l'assurance de ma considération la plus distinguée,

Le Directeur du Bureau Central Météorologique,

À Monsieur Robert H. Scott, E. MASCART.

Secretary of the Météorological Office.

With reference to the letter from General Greely (Minutes, p. 102) Mr. Scott was instructed to forward to Washington such tables as he should be able to supply, and to submit an estimate of the probable expense of calculating others for which materials exist.

Mr. Scott submitted the following report in connexion with a proposed addition of tables to the Weekly Weather Report, suggested by the Chairman:—

SIR, Meteorological Office, 24th January 1888.

IN accordance with instructions received I beg to submit herewith a copy of the form in which the proposed new mean values for the Weekly Weather Report would appear, if their publication be ordered.

The means would be for periods of four weeks, four weeks, and five weeks, in each quarter; but occasionally another week would have to be included in some part of the year in order to include the odd days which are lost, owing to the fact that 52 weeks contain one day less than the calendar year, and two days less than leap year.

The values will have to be worked out specially, each month, and could be ready for printer within a week of the end of the period to which they refer.

As the Monthly Weather Report is to be proceeded with, may I venture to ask whether this information is of sufficient scientific value to render its preparation necessary? The periods are very unequal in length, and the values obtained from them may be supposed to clash with those for the calendar month, which will appear in the Monthly Report.

Your, &c.

R. H. Scott, Esq. (Signed) FREDC. GASTER.

The information, if published, will just fill one page, Weekly Weather Report size.

SUMMARY of the TEMPERATURE, RAINFALL, and BRIGHT SUNSHINE VALUES recorde in the BRITISH ISLANDS during the weeks ended 188 .

(The Stations are those the values from which are published in the Weekly Weather Report.)

DISTRICTS.	STATIONS.	TEMPERATURE.								RAINFALL.					BRIGHT SUNSHINE.	
		Means of			Difference from the Average.	Absolute Extremes.				Total Fall.			Greatest Fall in One Day.			
						Minima.		Maxima.								
		Daily Minima.	Daily Maxima.	Daily Means.		Value.	Date.	Value.	Date.	No. of Rainy Days.	Fall in Period.	Difference from the Average.	Amount.	Date.	No. of Hours recorded.	Percentage of Possible Duration.
O. SCOTLAND, N.	Sumburgh Head -	°	°	°	°	°		°			Ins.	Ins.	Ins.			
	Stornoway - -															
	Wick - - -															
	Lairg - - ℔															
	Glencarrow - ℔															
	Fort Augustus - ℔															
	etc. etc.															

It was decided that the preparation of the above form was not necessary.

Submitted the following:—

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the last Meeting of the Meteorological Council, naming the Day and Hour of Issue, the Coasts warned, the Signals hoisted, the Gales experienced (with the approximate time of their occurrence), and the Result, as to the character of the Warning.

1. WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any) and approximate Time of Occurrence.	Result.* Character of Warning.
1888.				
Jan. 15th, 9.40 a.m.	England, S.W. -	North cone	Moderate Ely. to N.Ely. gales, on 16th.	B
,, ,,	,, South -	,,	,, ,, ,,	B
,, ,,	,, S.E. (mouth of Thames).	,,	,, ,, ,,	B
Jan. 23rd, 3.30 p.m.	Scotland, N. (Shetland Isles and Caithness).	South cone	Strong Wly. gale, night of 23rd -	A
,, ,,	,, West† -	,,	Strong S.Wly. winds early on 25th	B
,, ,,	Ireland, S. and W. (Galway only).	,,	Strong S.Wly. gale, night of 24th -	A
,, ,,	,, E.† (Belfast only).	,,	Strong S.Wly. winds, early on 25th	B

* A = complete success (*i.e.*, justified by gales of force 8 or more, Beaufort's scale).
B = partial ,, ,, ,, strong winds or moderate gales (forces 6 and 7).
C = total failure (*i.e.*, not justified by either gales or strong winds).

† Information at present available for these coasts insufficient to give reliable results.

SUMMARY.

Percentage of A + B - - - - - -	100
,, C - - - - - -	0
	100

2. GALES EXPERIENCED BUT FOR WHICH NO WARNINGS WERE ISSUED.

None.

(Signed) FREDC. GASTER.

Telegraphic Branch,
25th January 1888.

Mr. Scott reported that on the 20th instant he had held an examination of the unclassified clerks in the Office, to fill the vacancy among the fourth-class clerks caused by the death of Mr. Stevens (Minutes, p. 64).

The list of candidates was as follows :—

C. A. Bracey.	W. H. Parsons.
H. G. Brown.	L. H. Powers.
F. E. Dash.	A. E. Pycock.
E. J. Hood.	J. T. Williams.

The subjects for examination were the same as on the previous occasion (Minutes, p. 98).

The result of the examination was that L. H. Powers was first, and that four others, C. A. Bracey, H. G. Brown, E. J. Hood, and J. T. Williams, came out not far below him, and were pretty nearly equal *inter se*.

Resolved—That L. H. Powers be appointed, salary to commence at 55*l.* from January 1st, but increment to commence from April 1st, 1889.

Read—A memorandum from Captain Toynbee reporting that since the last meeting 12 logs had been received, 8 of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last Mention on Minutes.
Capt. P. Aldrich, R.N., and Chen Ngen Tao, Lieut., I.C.N.	H.M.S. "Egeria"	July 1—Oct. 31, 1887.	Surveying off Ceylon, and to Singapore, Christmas Island, and Mauritius.	1887, p. 48.
Comr. L. S. Dawson, R.N. Lieut. H. H. Douglas, R.N.	H.M.S. "Sylvia"	Nov. 1, 1887—Jan. 15, 1888.	Surveying in Red Sea and Mediterranean.	1887, p. 103.
Capt. G. Denham (the late).	S.S. "Ocean King."	May 14—Nov. 15, 1887.	Two voyages to and from Montreal, one from Swansea to New Orleans.	1886, p. 91.
Capt. R. Draper -	S.S. "Monarch"	May 7—Sept. 15, 1887.	Cable-laying off coasts of British Isles.	1887, p. 16.
Capt. T. K. Exham	S.S. "Severn" -	Oct. 1, 1887—Jan. 4, 1888.	Southampton to West Indies and Havre.	—
Capt. H. R. F. Plater	"Patriarch" -	March 11, 1887—Jan. 10, 1888.	To and from Sydney -	1885, p. 96.
Capt. G. W. Read, F.R.G.S., and W. H. Richardson, Chief Officer.	S.S. "Auretta"	Aug. 9, 1887—Jan. 14, 1888.	Cardiff to Kurrachi, Bimlipitam, Marseilles, viâ Suez, Odessa, and Hull.	—
Capt. W. L. Rosseter	Barque "British Nation."	July 13—Dec. 9, 1887.	Calcutta to Trinidad, Barbadoes, and Demerara.	1887, p. 32.

Mr. Scott was instructed to present Charts (O. 43) to Captain Read, (O. 32) to Captain Exham and Mr. Richardson, and to convey the best thanks of the Council to the other observers and to the representatives of the late Captain Denham.

Reported.—That the cash accounts for the six months ended the 30th September 1887 had been this day audited by the Chairman and Mr. Stone, and would be sent forthwith to the Treasury for the Audit Office. The receipts for the six months, exclusive of a balance of 2,382*l.* 8*s.* 9*d.*, on the 1st April 1887, amounted to 7,522*l.* 11*s.* 9*d.* The payments amounted to 7,089*l.* 7*s.* 10*d.*, leaving a balance of 2,815*l.* 12*s.* 8*d.* in hand and at the bank on the 1st October last.

Submitted—The following statement of accounts for the nine months ending 31st December 1887:—

Income.	£ s. d.	£ s. d.	Expenditure.	£ s. d.	£ s. d.
Balance from year 1886–87	- - -	2,022 15 7	Administration:		
Proportion of vote for nine months - -	- - -	11,475 0 0	Payment of Council -	750 0 0	
Repayment of expenses charged under—			Secretary - -	600 0 0	
(1.) Incidental expenses -	9 8 1		Salaries and wages -	606 8 0	
(2.) Special researches	12 6 0		Rent, fuel, and lighting	528 11 2	
(3.) Observatories -	1 4 8		Furniture and fittings	66 9 8	
		22 18 9	Incidental and contingent expenses -	263 13 0	
			Pensions - -	32 2 3	
					2,847 4 1
Supply of Weather Information:			Special Researches	- - -	560 9 0
D.W. Charts and Forecasts - - -	195 14 8		Land Meteorology:		
6 p.m. Charts - -	18 15 0		Observatories and stations - -	1,372 14 9	
Information for Press Agencies, &c. - -	94 3 10		Discussion and reduction of observations -	972 9 6	
Telegrams - -	129 15 7				2,345 4 3
		438 9 1	Weather Information and Forecasts:		
Sale of Instruments, &c.:			Telegraphic reports and storm warnings	2,088 8 0	
Royal Navy account -	0 5 0		Preparation and issue of reports and forecasts - -	1,250 5 9	
Mercantile Marine account - -	15 19 9				3,338 13 9
		16 4 9	Inspections:		
Commission charged on work done for Colonies, &c. - -	- - -	5 15 3	Salaries and travelling	- - -	449 10 4
			Ocean Meteorology:		
			Discussion and reduction of observations -	1,416 9 6	
			Expenses incidental to the supply of instruments:		
			Proportion for care and issue of instruments -	150 0 0	
			Royal Navy -	171 4 10	
			Mercantile Marine	165 9 6	
			Distant island and coast stations -	36 16 11	
					1,940 0 9
			Balance - -	- - -	2,500 1 3
		£13,981 3 5			£13,981 3 5

Liabilities.	£ s. d.	Assets.	£ s. d.
To Council - - - -	750 0 0	By H.M. Exchequer - - -	975 0 0
„ contracts or work uncompleted -	113 8 0	„ cash at Bank - - -	2,684 10 0
„ Post Office (partly estimated) -	240 3 2	„ „ at Office - - -	79 8 6
„ sundry creditors - - -	386 4 2	„ „ at Valencia - - -	50 0 0
„ balance - - - -	2,500 1 3	„ sundry debtors - - -	200 18 1
	£3,989 16 7		£3,989 16 7

116, *Victoria Street, February* 8, 1888.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.	MR. GALTON.
PROFESSOR DARWIN.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (January 25) were read and confirmed.

Mr. Scott reported that the cost of preparing such tables as General Greely required would not exceed two guineas, and he was authorized to have the work executed (Minutes, p. 118).

With reference to the proposed International Tables, Mr. Scott was instructed to forward a notice of the work to "Nature," with the view of ascertaining the names of probable subscribers (Minutes, p. 118).

Submitted—The following memorandum (Minutes, p. 107):—

MEMORANDUM.

I HAVE looked carefully into the question of the want of accuracy in "Scotland, East" of the Hay Harvest Forecast for 1887—a report on which is given in the Minutes, pp. 106 to 108. The result of this examination is to show:—

(1.) That the main defect occurred in the neighbourhood of Dirleton. From the recipient of our telegrams at this station we had observations of the weather experienced on only 12 out of the 30 days for which the forecasts were issued, and these showed a percentage of success as low as 58. The returns from the three other stations gave (with a slight correction to one of them) an average percentage of 81 for the district, instead of 75, as reported.

(2.) Even this value was a little low—owing to the fact that the rain which occurred was of a very local character, so that the forecasts (drawn up for the district as a whole) were often wrong in one portion of the district and right in another. Thus, a general forecast such as "Cloudy, some rain," was right as a whole, but wrong for a locality where there was no rain, though right in one where showers occurred. Local variations of wind, also (especially during light breezes) frequently made the forecasts faulty for one station which were accurate for another.

FREDC. GASTER,
7/1/88.

R. H. Scott, Esq.,
Secretary.

Read—Letter 248 from Baron van Heerdt stating that the Dutch Government had allowed the sum of 100*l.*, to be spread over three years, for the cost of copying data relating to the Indian Ocean (Minutes, 1885, p. 61).

Mr. Scott was authorised to supply the data, the work to be done outside the Office (Minutes, 1886, p. 134).

Read—Letter 349 from Mr. Buchan requesting the supply of certain data from the Red Sea.—Granted.

Submitted—The following memorandum:—

I HEREWITH submit, in pursuance of instructions (Minutes, 1886, p. 112), diagrams for the Red Sea data from R.N. logs for January, together with the diagrams submitted last year.

I await instructions as to further action. Is it the wish of the Council that we should collect information for the remaining months of the year from the same sources as were used for the specimen charts, and deal with it according to the Minute referred to?

Shall we discuss observations taken in Red Sea ports?

(Signed) HENRY TOYNBEE,
Marine Superintendent,
8/2/88.

Resolved—That Captain Toynbee carry on the discussion for the other months, combining the information from all the sources, and inserting also data for the different ports wherever obtainable.

Read—A memorandum from Captain Toynbee reporting that since the last meeting six logs had been received, five of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. H. Bright -	Bque. "Beltana"	May 11, 1887—Jan. 24, 1888.	London to Adelaide and home.	1886, p. 126.
Capt. E. Halley -	"City of Madras"	July 26, 1886—Jan. 25, 1888.	Cardiff to San Francisco and home.	1885, p. 46.
Comr. R. F. Hoskyn, R.N. Lieut. F. Bowden Smith, R.N.	H.M.S. "Myrmidon."	July 1—Oct. 31, 1887.	Surveying at Australian Station.	1887, p. 48.
Capt. R. Jones -	"Thomas Hilyard."	April 11, 1886—June 10, 1887.	Liverpool to New York, Sydney, Manila, New York.	—
Capt. C. W. Pearson	S.S. "Strathleven."	Feb. 9, 1887—Jan. 31, 1888.	Glasgow, Japan, China, New York, Gibraltar.	1886, p. 106.

Mr. Scott was instructed to present the Charts (O. 43) to Captain Jones, and to convey the best thanks of the Council to the other observers.

Submitted the following:—

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the last Meeting of the Meteorological Council, naming the Day and Hour of Issue, the Coasts warned, the Signals hoisted, the Gales experienced (with the approximate time of their occurrence), and the Result,—as to the Character of the Warning.

1. WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result.* Character of Warning.
1888.				
Jan. 24th, 7.20 p.m. -	Ireland, S. (except Galway).	South cone	Fresh N.W. gale, night of 25th -	A
„ „ -	„ E. (southern part).	„	Fresh to strong N.W. gale, night of 25th, and on 26th.	A
„ „ -	England, N.W. -	„	Strong N.W. gale on 26th - -	A
Jan. 25th, 3 p.m. -	Scotland, E. (except Dunrossness and Wick).	South cone	Fresh N.W. gale, morning of 26th -	A
„ „ -	England, W. -	„	Fresh to strong N.W. gale, night of 25th, and on 26th.	A
„ „ -	„ E. (northern part).†	„	Strong N.W. winds, on 26th -	B
„ 3.10 p.m. -	Ireland, S. (Galway only).	„	Severe W. to N.W. gale, night of 25th.	A
„ „ -	„ E. (northern part).	„	Strong W. to N.W. gale, on 26th -	A
„ „ -	Scotland, E. (Dunrossness and Wick only).	„	Strong N.W. winds, on 26th -	B
„ „ -	„ W. -	„	Fresh N.W. gales, night of 25th -	A
„ 7.30 p.m. -	England, S.W. -	„	Fresh N.W. gales, on 26th - -	A
„ „ -	„ S. -	„	„ „ - -	A
„ „ -	„ S.E. -	„	„ „ - -	A
„ „ -	„ E. (southern part).	„	Strong N.W. winds, on 26th -	B

* A = complete success (*i.e.* justified by gales of force 8 or more by Beaufort's scale).
B = partial „ („ „ winds „ 6 or 7 „).
C = failure „ („ not justified by either gales or strong winds).
† Information at present available from these coasts insufficient to give very reliable results.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result. — Character of Warning.
1888.				
Jan. 29th, 7.10 p.m. -	Scotland, E. (Dunrossness and Wick only).	South cone	Neither gales nor strong winds -	C
Jan. 30th, 7.30 p.m. -	Ireland, S. (Galway only).	North cone	Severe N. gale, on 31st - -	A
„ „ -	„ E. (northern part).	„	Fresh N. gale, on 30th - -	A
„ „ -	Scotland, E. (northern part).†	„	Strong N.E. winds, on 30th -	B
„ „ -	„ W. -	„	„ „ - -	B
„ „ -	England, N.W. -	„	Fresh N. gale, evening of 31st -	A
Jan. 31st, 10 a.m. -	Ireland, S. (except Galway).	North cone	Fresh N. gale, on 31st - -	A
„ „ -	„ E. (southern part).	„	„ „ „ - -	A
„ „ -	Scotland, E. (southern part).	„	Neither gales nor strong winds -	C
„ „ -	England, W. - -	„	Moderate to fresh N. gales, on 31st	A
„ „ -	„ S.W. -	„	Strong N.W. gale, evening, of 31st	A
„ „ -	„ S. -	„	Moderate N.E. gale, night, of 31st -	B
„ „ -	„ S.E. -	„	„ „ „ -	B
„ „ -	„ E. - -	„	Fresh S.Ely. gale, evening of 31st -	A
Feb. 1st, 7.0 p.m. -	Ireland, S. (Galway only).	North cone	Neither gales nor strong winds -	C
„ „ -	„ E. (northern part).†	„	„ „ „ -	C
„ „ -	Scotland, E. (northern part).	„	„ „ „ -	C
„ „ -	„ W. -	„	Strong S.W. winds, on 2nd -	B
Feb. 2nd, 7.20 p.m. -	Ireland, E. (southern part).	North cone	Neither gales nor strong winds -	C
„ „ -	Scotland, E. (southern part).	„	„ „ „ -	C
„ „ -	England, N.W. -	„	„ „ „ -	C
„ „ -	„ W. -	„	„ „ „ -	C
„ „ -	„ E. (northern part).	„	„ „ „ -	C
	The two last sets of warnings were issued in consequence of a decided fall of the barometer on our northern coasts. The fall was occasioned by a depression which at one time seemed to the Forecaster likely to travel south-eastwards down the North Sea. The disturbance, however, moved away eastwards towards Norway, and the wind on our coasts neither veered nor increased. On the evening of the 2nd considerable doubt existed with regard to the accuracy of the barometer readings at our extreme northern stations.			
Feb. 7th, 3.50 p.m. -	Scotland, E. (Dunrossness and Wick only).	North cone	Fresh N.W. gale, on night of 7th -	A

† Information at present available for these coasts insufficient to give reliable results.

SUMMARY.

A - - - - - - - = 20
B - - - - - - - = 8
C - - - - - - - = 10

Equivalent percentages:
A + B - - - - - - = 74
C - - - - - - - = 26

. GALES FOR WHICH NO WARNINGS WERE ISSUED.—None.

FREDC. GASTER.

Telegraphic Branch,
8th February 1888.

Submitted—The following Report on the forecasts for January 1888 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

JANUARY.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	66	42	54	83
,,	b	15	42	29	
,,	c	15	8	11	
,,	d	4	8	6	
Scotland, E.	a	58	69	64	91
,,	b	31	23	27	
,,	c	7	0	3	
,,	d	4	8	6	
England, N.E.	a	69	66	68	87
,,	b	23	15	19	
,,	c	4	15	9	
,,	d	4	4	4	
England, E.	a	58	46	52	85
,,	b	35	31	33	
,,	c	7	15	11	
,,	d	0	8	4	
Midland Cos.	a	54	58	56	85
,,	b	35	23	29	
,,	c	11	19	15	
,,	d	0	0	0	
England, S.	a	73	58	66	93
,,	b	27	27	27	
,,	c	0	15	7	
,,	d	0	0	0	
Scotland, W.	a	39	69	54	87
,,	b	38	27	33	
,,	c	15	0	7	
,,	d	8	4	6	
England, N.W.	a	61	65	63	94
,,	b	31	31	31	
,,	c	4	0	2	
,,	d	4	4	4	
England, S.W.	a	31	42	37	75
,,	b	50	27	38	
,,	c	8	12	10	
,,	d	11	19	15	
Ireland, N.	a	54	62	58	77
,,	b	19	19	19	
,,	c	12	4	8	
,,	d	15	15	15	
Ireland, S.	a	46	54	50	83
,,	b	35	31	33	
,,	c	8	8	8	
,,	d	11	7	9	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	45	48	47	86
,,	b	39	39	39	
,,	c	10	10	10	
,,	d	6	3	4	
Scotland, E.	a	58	65	62	89
,,	b	23	32	27	
,,	c	13	0	7	
,,	d	6	3	4	
England, N.E.	a	64	78	71	91
,,	b	23	16	20	
,,	c	13	3	8	
,,	d	0	3	1	
England, E.	a	65	58	62	88
,,	b	26	26	26	
,,	c	9	13	11	
,,	d	0	3	1	
Midland Cos.	a	49	61	55	83
,,	b	32	23	28	
,,	c	16	16	16	
,,	d	3	0	1	
England, S.	a	68	65	67	97
,,	b	29	32	30	
,,	c	0	0	0	
,,	d	3	3	3	
Scotland, W.	a	42	58	50	87
,,	b	48	26	37	
,,	c	10	10	10	
,,	d	0	6	3	
England, N.W.	a	58	71	65	89
,,	b	39	10	24	
,,	c	3	10	7	
,,	d	0	9	4	
England, S.W.	a	49	55	52	85
,,	b	39	26	33	
,,	c	6	16	11	
,,	d	6	3	4	
Ireland, N.	a	55	61	58	78
,,	b	16	23	20	
,,	c	19	10	14	
,,	d	10	6	8	
Ireland, S.	a	58	58	58	82
,,	b	19	29	24	
,,	c	13	13	13	
,,	d	10	0	5	

SUMMARY.

British Isles	a	55	57	56	85
,,	b	31	27	29	
,,	c	8	9	9	
,,	d	6	7	6	
British Isles	a	56	62	59	87
,,	b	30	26	28	
,,	c	10	9	10	
,,	d	4	3	3	

Read.—Letter 257 from Commander Dawson, H.M.S. "Sylvia," asking if instruments could be issued for use on the Island of Perim. Mr. Scott was instructed to write to Mr. Eliot stating the hope of the Council that the Indian Government would organize meteorological observations at Perim and Aden, and that, if possible, observations of currents should be made at the entrance to the Red Sea, as the subject is very important for navigation. (P. C. 360.)

It was resolved that a further honorarium of 50*l.* be paid to Mr. W. N. Shaw, for his research on Hygrometry (Minutes, p. 64). See Minutes, 1884, p. 25.

Submitted—The following statements of work during January 1888:—

MARINE ROOM.

February 7, 1888.

Examined 12 new logs.

North Atlantic Weather Charts.

Reduced charts prepared and forwarded to the lithographer to August 19, 1883. Proofs of lithographed sheets to July 5 received, and to June 14 passed for press.

Discussing variations of sea temperature in the neighbourhood of the banks of Newfoundland during the four typical months August, November, February, and May.

Tracks of low-pressure systems drawn for the whole period of 13 months for Secretary.

Investigating the changes connected with disturbances on August 25 and 26, 1882, and at the end of February and the beginning of March 1883.

General.

Discussing the information collected for the Arabian Sea and its neighbourhood for May and June 1885.

Discussing Office data in the Red Sea.

Charts prepared of the distribution of pressure and winds over the North Atlantic from October 1 to 8, 1886, the data used being those only which have been received by the Office in the ordinary way.

The female staff engaged chiefly on charting current data, under the supervision of Lieutenant Baillie.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE.

PANTAGRAPH ROOM.

February 1, 1888.

Observatory Returns.—The daily and other means for June 1885 completed, the hourly vapour-tension values worked, and the Hourly Readings copied and sent to printer. The means for July 1885 are well advanced, and the vapour-tension values are calculated, but not checked. Proof of Hourly Readings for May 1885 read and corrected for press.

Harmonic Analyser.—The analysis of the barograms for 1878 has been completed, and the curves for 1879 are now in hand.

Miscellaneous.—The Bunhill Row Sunshine Cards for fourth quarter of 1887 tabulated for Royal Meteorological Society. The report of the Krakatoa Committee has occupied most of my own time, and some of Mr. Thompson's. I was absent from Office a week on leave.

(Signed) R. H. CURTIS.

R. H. Scott, Esq., F.R.S.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH.

(To 31st January 1888.)

Monthly Weather Report, 1887:—

January and *February.*—Both in type.

March.—About half written.

Other months, to end of year.—Tables and rough maps all prepared. As the Council have now consented to the continuation of this work, it will be proceeded with as rapidly as possible.

Weekly Weather Report:—

1887. All the Appendices have been passed through the press, and will be issued in a day or two. The title page, preface, &c., is in proof.

1888. Weekly numbers issued to date.

Daily Weather Report:—
1887. All issued. Title page, frontispiece, and summary for December also issued.
1888. All numbers issued promptly to date, with new temperature averages.
Checking of Storm Warnings Issued.—Done to date.
Checking of Daily (3.30 *p.m. and* 8.30 *p.m.*) *Forecasts.*—Done to date.
Plotting of Daily Telegrams from the United States.—Done to date.
Hay Harvest Forecasts, 1887.—Examination into question of inaccuracy for Scotland, East, completed.
Examination of Cloud Photographs and Pictures, with a view to their classification.—Several hours have been spent on this work, and many more hours of my private time at home. Work now nearly complete.

(Signed) FREDC. GASTER.

EXAMINATION ROOM.

February 1, 1888.

Examinations.

January, 1886.—Completed.
February, 1886.—*Thermograms.*
December, 1887.—Partial examination of the Valencia work for the Registrar-General of Ireland.
Weekly examination (on receipt) of curves and documents from all stations.

Reports, &c.

December 1885 and January 1886.—*Notes of Errors* to Aberdeen, Armagh (*anemograms*), Falmouth, Kew (*anemograms*), and Valencia, and reports thereon to Council.
Investigations and report on the differences between the records by the Beckley and check gauges at Falmouth.

(Signed) T. E. ALLEN.

Reported—That the following cheques had been drawn during January 1888:—

1888.		£	s.	d.
Jan. 7th.	J. S. Harding, jun., for payment of weekly salaries -	15	13	4
„ 11th.	Paris M.O., telegrams - - - - -	*4	3	2
„ „	Bank of England, Stationery Office account, Annual Report, 1885–86 - - - - -	11	16	3
„ „	Williams and Norgate, books - - - -	5	19	3
„ „	G. A. Gillett, wood, oil, &c. - - - -	4	15	2
„ „	T. De La Rue & Co., sunshine cards - - -	8	15	0
„ „	J. E. Cullum, expenses, Valencia observatory - -	20	13	0
„ „	Negretti & Zambra, instruments and repairs - -	82	4	3
„ „	P. Adie „ „ - -	36	11	0
„ „	L. P. Casella, rain-gauges - - - -	12	9	6
„ „	B. Edgington, signal cones - - - -	15	6	0
„ „	W. C. Ley, salary - - - - -	37	10	0
„ „	R. Riviere and Son, presentation labels - - -	1	18	0
„ „	P. & O. Co., freightage - - - - -	1	14	6
„ 14th.	J. S. Harding, jun., for payment of weekly salaries -	16	0	0
„ 18th.	Utrecht M.O., telegrams - - - -	*11	11	0
„ 21st.	J. S. Harding, jun., for payment of weekly salaries -	16	0	0
„ 25th.	Pall Mall Coal Co., coals - - - -	4	4	0
„ „	Incandescent Gas Light Co., gas burners and fittings -	3	17	2
„ „	Wightman & Co., B.P. wrappers and printing - -	8	15	0
„ „	Johnson, Matthey, & Co., chemicals - - -	4	14	0
„ „	Hopkin and Williams „ - - -	3	13	3
„ „	Kew Committee, verifications - - - -	11	15	0
„ „	Postmaster General, telegrams - - - -	130	3	2
„ 27th.	Paris M.O. „ - - - -	*4	5	7
„ „	Hamburgh M.O. „ - - - -	*17	9	5
„ „	„ current observations - - -	*2	2	4
„ „	J. S. Harding, jun., for payment of weekly salaries -	16	0	0
„ „	R. H. Scott, Secretary - - - - -	66	13	4
„ „	J. S. Harding } Office salaries - - -	27	15	6
„ „	T. D. Bell - }	15	16	8
	Carried forward - -	£620	3	10

* Paid by draft on a foreign banker.

			£	s.	d.
1887.		Brought forward - - -	620	3	10
Jan. 28th.	J. Sheerman, salary, harmonic analysis - - -		10	16	8
„ „	J. E. Cullum, salary (Valencia Observatory) - -		18	15	0
„ „	R. H. Curtis - - -	Salaries (discussion, &c. of observations).	22	18	4
„ „	J. A. Curtis - - -		18	6	8
„ „	T. E. Allen - - -		16	13	4
„ „	C. H. Thompson - -		12	10	0
„ „	S. Call - - -		11	13	4
„ „	R. G. Canham - -		7	10	0
„ „	A. H. Bell - - -		7	10	0
„ „	F. Gaster - - -	Salaries (preparation, &c. of Weather Reports).	25	15	7
„ „	F. J. Brodie - - -		18	5	7
„ „	G. G. Francis - -		17	16	3
„ „	A. J. Rigby - - -		17	6	10
„ „	R. Sargeant - - -		12	3	9
„ „	A. R. Simpkins - -		10	6	3
„ „	C. W. Heinemann - -		5	0	0
„ „	Capt. H. Toynbee - -	Salaries (discussion, &c. of observations, and care of instruments).	33	6	8
„ „	Nav.-Lieut. C. W. Baillie, R.N.		22	18	4
„ „	R. Strachan - - -		27	15	6
„ „	C. Harding - - -		22	18	4
„ „	H. Harries - - -		15	0	0
„ „	W. Allingham - -		15	0	0
„ „	W. G. James - - -		11	5	0
„ „	F. T. Bullen - - -		9	3	4
„ „	R. F. Wallace - -		8	15	0
„ „	F. Gaster, for payment of allowances for extra attendance - - - - - - -		17	10	2
„ „	Gas Light and Coke Co., gas - - - -		8	6	3
„ „	H. Bond, Office repairs, &c. - - - -		18	4	10
„ „	E. Higgs, „ - - -		7	7	6
„ „	J. Jackson, special ink - - - - -		2	4	0
„ „	Kew Committee, cloud experiments - - -		14	14	1
„ „	J. E. Cullum, expenses, Valencia Observatory - -		13	19	0
„ „	T. J. Leslie, petroleum „ - - -		7	18	9
„ „	T. De La Rue & Co., sunshine cards - - -		4	4	6
„ „	J. S. Harding, jun., petty cash - - - -		50	0	0
			£1,164	2	8

116, *Victoria Street, February* 22, 1888

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.	MR. GALTON.
PROFESSOR DARWIN.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (February 8) were read and confirmed.

The subject of the future work of the Marine Branch of the Office, after completion of the charts for the Red Sea, was taken into consideration, and it was resolved that the next district to be examined was to be that extending from Long. 40° E. to 180° E., and from Lat. 35° S. as far south as observations are available.

Submitted the following memorandum :—

MEMORANDUM.

Meteorological Office, February 22, 1888.

METEOROLOGICAL OBSERVATIONS taken at various COLONIAL and FOREIGN STATIONS by the ROYAL ENGINEERS and by the OFFICERS of the ARMY MEDICAL DEPARTMENT during the years 1852–1884.

I BEG to report that the copying and preparation for press of these returns is now complete. As will be seen from the list appended to this memorandum, there are in all 486 sheets, each sheet containing the data for one station for one year or part of a year. This number also includes 10 sheets of night observations (9.30 p.m. and 3.30 a.m.) at Mauritius, and eight sheets containing observations made at Sierra Leone in 1847–51 by Surgeon-General Lawson.

Distribution of the Stations.

The distribution of the stations, geographically, is as follows :—

North America and North Atlantic	88	sheets.
The Mediterranean	87	„
The West Indies	111	„
West Coast of Africa and South Atlantic	30	„
South Africa	37	„
Indian Ocean	85	„
China	29	„
Australasia	19	„
Total	486	„

Form used for Copying upon.—Size of Printed Volume.

The observations have been copied out upon the Form B., adopted by the Rome Congress in 1879 for international use, but slightly modified on account of the hours of observation. Each sheet occupies in print two-thirds of a quarto page, and therefore if the observations are published in their entirety in one volume they will make a book of about 325 pages, which would be about half as thick again as the volume of "Returns from Stations of the Second Order, 1883," lately issued.

If, however, only those sheets are printed that are fairly complete, the size of the publication will be reduced according to the standard adopted. The positions of the station will not need to be repeated for each year, and some further economy of space will result from this.

Cyprus.

I have not copied the observations for Cyprus, because observations from this island have already been published by Dr. Hann, of Vienna.

Examination of the Observations.

There has been no systematic examination of the observations themselves in this Office, but incidentally a considerable amount of checking has been done. And in addition to this I have read over again the whole of the sheets myself in order to detect any manifest errors. The *copying* has been checked in each case, and the yearly sums and means have been both worked and checked in the Office.

Cost of the Work.

As regards the cost of the work, it was very early found to be impossible to adhere to the plan of a fixed charge per sheet, and consequently authority was asked for and granted to charge for the work according to the time occupied. The total cost, however, of the work to date has been less than the estimate, namely 126*l.* 11*s.* 9*d.*, as against 127*l.* 8*s.* 0*d.* (see Minutes, pages 13 and 23, 1886–87).

I must, however, remark that the preparation of the Wind and Weather Summaries has not been done quite according to the estimate, for the requisite data was in certain cases wanting. On the other

hand, a great deal of work has been done which was not included in the estimates as submitted; for instance, the working out of the values of Vapour Tension and Relative Humidity, and all the *examination* of the observations which has been done.

Correction of Barometer Readings.

The barometer readings have been in all cases corrected for index error, and reduced to 32° Faht., but no correction has been applied for altitude or gravity. Most of the stations are only of moderate altitude, say under 300 feet above mean sea level, and I beg to submit, for the consideration of the Council, whether it would not be advisable to apply the correction for altitude to the values at such stations.

Printing.

I beg leave also to ask for the decision of the Council as to the method of printing, that is whether the order should be that of the appended list, where the stations are grouped in districts and all the information for one district is given together, or how?

Data for 1885–86.

The work has been in hand a considerable time (over 18 months), and now more data is available. Is it desirable to obtain from the Army Medical Department the sheets for 1885 and 1886 and include the results for those years in our publication?

Lustra.

For some stations, though not for all, it is possible to obtain the means for periods of 5, 10, or 15 years. Would the Council desire me to work out such means where I can, and if so, shall I adopt the longest period available, of course keeping to the same 5, 10, or 15 years?

(Signed) J. A. CURTIS.

R. H. Scott, Esq., F.R.S.

RETURNS from ROYAL ENGINEERS and ARMY MEDICAL DEPARTMENT STATIONS.

District.	Station.	Years.	Total No. of Sheets.
North America and North Atlantic.	New Westminster (B. Columbia), R.E.	1860–1861	2
	Newfoundland, R.E.	1852–1862	11
	Newfoundland, A.M.D.	1866–1870	5
	Quebec, R.E.	1853–1861	6
	Quebec, A.M.D.	1866–1870	5
	Halifax, R.E.	1852–1862	11
	Halifax, A.M.D.	1866–1875	9
	Kingston, R.E.	1853–1861	9
	Bermuda, R.E.	1852–1862	11
	Bermuda, A.M.D.	1866–1884	19
		Total	88
Mediterranean	Gibraltar, R.E.	1852–1862	11
	Gibraltar, A.M.D.	1866–1884	19
	Malta, R.E.	1852–1861	9
	Malta, A.M.D.	1866–1884	19
	Corfu, R.E.	1852–1861	10
	Scutari, A.M.D.	1866–1884	19
		Total	87
West Indies	Bahamas, R.E.	1852–1862	11
	Bahamas, A.M.D.	1866–1884	18
	Jamaica (Newcastle), A.M.D.	1866–1884	19
	Jamaica (Up Park Camp), R.E.	1852–1861	10
	Jamaica (Up Park Camp), A.M.D.	1866–1884	19
	Honduras, A.M.D.	1866–1870	5
	Barbados, R.E.	1853–1862	10
	Barbados, A.M.D.	1866–1884	19
		Total	111
West Coast of Africa and South Atlantic.	Bathurst, A.M.D.	1869	1
	Sierra Leone, A.M.D.	1874–1884	11
	Sierra Leone (Lawson), day	1847–1851	5
	Sierra Leone (Lawson), night	1849–1851	3
	St. Helena, R.E.	1853–1862	10
		Total	30

District.	Station.	Years.	Total No. of Sheets.
South Africa - -	Natal, A.M.D. - - - - -	1868–1884	17
	Grahamstown, R.E. - - - -	1853–1862	10
	Grahamstown, A.M.D. - - - -	1867–1870	4
	Capetown, A.M.D. - - - -	1870–1875	6
		Total -	37
Indian Ocean - -	Trincomalee, A.M.D. - - - -	1865–1875	11
	Kandy, A.M.D. - - - - -	1866–1875	10
	Colombo, R.E. - - - - -	1852–1862	11
	Colombo, A.M.D. - - - -	1866–1875	10
	Newera Eliya, A.M.D. - - - -	1866–1872	7
	Singapore, A.M.D. - - -	1868–1884	16
	Mauritius, R.E., day - - - -	1852–1861	10
	Mauritius, R.E., night - - - -	1852–1861	10
		Total -	85
China - - -	Hong Kong, R.E. - - - -	1853–1862	10
	Hong Kong, A.M.D. - - - -	1866–1884	19
		Total -	29
Australasia - - -	Fremantle, R.E. - - - -	1852–1859	5
	Auckland, R.E. - - - - -	1853–1862	10
	Auckland, A.M.D. - - - -	1866–1869	4
		Total -	19

Submitted the following :—

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the last Meeting of the Meteorological Council, naming the Day and Hour of Issue, the Coasts warned, the Signals hoisted, the Gales experienced (with the approximate Time of their occurrence), and the Result—as to the character of the Warning.

1. WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signals hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result.* — Character of Warning.
1888.				
Feb. 7th, 7.10 p.m. -	Ireland, E. (northern part).	North cone	Neither gales nor strong winds -	C
„ „ -	Scotland, E. (Inverness and Aberdeen).	„	Strong N.Wly. winds, early on 8th	B
„ „ -	„ W.† -	„	Neither gales nor strong winds -	C
Feb. 8th, 7.30 p.m. -	Ireland, E. (southern part).	„	„ „ „ -	C
„ „ -	Scotland, E. (southern part).	„	„ „ „ -	C
„ „ -	England, N.W. -	„	„ „ „ -	C
„ „ -	„ E. (northern part).	„	„ „ „ -	C
	The warnings issued on the 8th would not have been issued had it been known that an area of high pressure was spreading Westwards from northern Russia towards Scandinavia. Our 6 p.m. reports give no information from that region.			
Feb. 13th, 7.30 p.m. -	England, S.W. -	North cone	Moderate Nly. gales, on 14th -	B
„ „ -	„ S. -	„	Moderate Nly. gales, evening 14th -	B
„ „ -	„ S.E. (mouth of Thames).	„	Strong Nly. winds, night of 14th -	B

* A = complete ~~success (*i.e.*, justified by gales of force 8 or more~~ by Beaufort's scale).
B = partial „ („ strong winds, force 6 or 7, by Beaufort's scale).
C = failure (*i.e.*, not justified by either gales or strong winds).
† Information at present available for these coasts insufficient to give reliable results.

Day and Hour of Issue.	Coasts warned.	Signals hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result. — Character of Warning.
Feb. 16th, 7.10 p.m. -	England. S.W. -	North cone	Strong Nly. gales, night of 17th -	A
" " -	" S. -	"	Moderate gales and strong winds, 17th.	B
" "	" S.E. -	"	" " " -	B
" " -	" E. (southern part).	"	Fresh N.Ely. gale, evening of 17th	A
Feb. 19th, 9.30 a.m. -	Ireland, S. (Galway only).	North cone	Gale reached its max. before warning was issued.	C
" " -	" E.† -	"	" " " -	C
" " -	Scotland, E. -	"	Moderate N.Ely. gale, night of 19th	B
" " -	" W.† -	"	Neither gale nor strong wind -	C
" " -	England, N.W. † -	"	Gale already blowing at Holyhead when warning was issued; increased a little later.	?
" " -	" E. (northern part).	"	Moderate N.Ely. gale, night of 19th	B
Feb. 20th, 7.10 p.m. -	England, W. (Bristol Channel).†	North cone	Neither gale nor strong wind -	C
" " -	" S.W. -	"	Moderate gale from N.E., on 21st -	B
" " -	" S. -	"	Strong N.E. gales, night of 20th -	A
" " -	" S.E. (mouth of Thames).	"	" " " -	A

† Information at present available for these coasts insufficient to give reliable results.

SUMMARY.

Total number issued - - - -	24
Number justified, A - - - -	4
" B - - - -	9
Number not justified, C - - - -	10
" doubtful - - - -	1

2. GALES EXPERIENCED WITHOUT WARNING.

One, on the Norfolk coast, at 6 p.m. 19th.

The period has been a very difficult one to deal with, and the absence of sufficient observations from the Continent at 6 p.m. is felt very severely with the type of pressure distribution which has recently prevailed. At the same time I have little doubt that observations from lightships, &c. when received will greatly modify the values given above.

(Signed) FREDC. GASTER.

Read—A memorandum from Captain Toynbee reporting that since the last meeting eight logs had been received, five of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. James Gordon	S.S. "City of Agra."	Nov. 12, 1887—Feb. 6, 1888.	Liverpool, Calcutta, and home, viâ Suez.	1887, p. 37.
Capt. P. J. Irving -	S.S. "Celtic" -	Aug. 24, 1887—Feb. 3, 1888.	Liverpool, New York, (five voyages).	1887, p. 48.
Capt. W. H. Milner	R.M.S. "Solent"	July 31—Nov. 28, 1887.	Between West Indies and Demerara.	1887, p. 32.
Capt. W. G. North -	S.S. "Tiger" -	Oct. 1, 1887—Feb. 1, 1888.	Trading between Hull and Hamburg.	1887, p. 48.
Capt. H. De La Cour Travers.	S.S. "Tartar" -	Sept. 23, 1887—Feb. 12, 1888.	Plymouth, Cape Town (two voyages).	1887, p. 49.

Mr. Scott was instructed to convey the best thanks of the Council to the above observers.

116, *Victoria Street, March* 7, 1888.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

PROFESSOR DARWIN. | MR. GALTON.

MR. STONE.

The Secretary was in attendance.

The Minutes of the last meeting (February 22) were read and confirmed.

Read—The following letter:—

(M.O. 549.)

SIR, Treasury Chambers, March 6, 1888.

REFERRING to your letter of 23rd November last, acknowledged by this Department on the 29th idem, I am directed by the Lords Commissioners of Her Majesty's Treasury to request you to move the Meteorological Council to cause their Lordships to be informed whether any further correspondence has passed since that date between your Office and the Scottish Meteorological Society, such as appears to be contemplated in the closing words of your letter to Mr. Buchan dated the 23rd November last.

I am, &c.
(Signed) W. L. JACKSON.

The Secretary, Meteorological Office,
116, Victoria Street, London, S.W.

Mr. Scott was instructed to inquire from Mr. Buchan whether any reply would be given by the Directors of the Ben Nevis Observatory to the letter from the Council of November 23, 1887 (Minutes, p. 83), and whether any suggestions can be made as to the last sentence of that letter (P. C. 559).

It was resolved, with reference to the payment to Mr. Buchan for his attendances, that so long as he attends one half of the meetings no deduction shall be made from the fees payable to him, on account of absence.

Read—A memorandum from Captain Toynbee reporting that since the last meeting six logs had been received, all of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. T. Alderton -	S.S. "Brindisi" -	Dec. 1, 1887—March 1, 1888.	London, Calcutta, and home, viâ Suez.	1883, p. 136.
Capt. E. Brown -	Barque "Moorhill."	May 6, 1887—Jan. 27, 1888.	Newport, Buenos Ayres, Barbados, Galveston, and home.	1885, p. 120.
Staff Comr. E. S. Clapp, R.N., and H. K. Sturdee -	Schooner "Richmond."	Aug. 21—Dec. 20, 1887.	At the Bahamas -	1887, p. 19.
Capt. W. C. Crutchley, R.N.R.	S.S. "Kaikoura"	Oct. 22, 1887—Feb. 21, 1888.	Plymouth, Cape Town, Hobart, Lyttelton, Rio Janeiro, and Plymouth.	1887, p. 28.
Capt. R. Draper -	S.S. "Monarch"	Oct. 4, 1887—Feb. 20, 1888.	Off Coasts of British Isles	1887, p. 120.
Comr. W. U. Moore, R.N., and Lieut. A. F. Balfour, R.N.	H.M.S. "Rambler."	Sept. 1—Dec. 31, 1887.	Surveying in China Sea	1887, p. 75.

Mr. Scott was instructed to convey the best thanks of the Council to the above observers.

The Chairman reported that he had examined the various comments on Mr. Abercromby's proposed cloud nomenclature, which had reached the Office, and that he did not consider that the matter called for the attention of the Council at present (Minutes, p. 95).

It was resolved that the returns from the various foreign and colonial stations (Minutes, p. 129) be subjected to further revision before printing. The returns for 1885 and 1886 to be obtained from the Army Medical Department, as suggested.

Read—The following letter :—

(M.O. 1458.)

MY DEAR SIR, Córdoba, June 2, 1887.

I HAVE had the honour to receive your kind letter of February 28th, and agree perfectly with you that it would be of the highest importance to have some meteorological stations in the Transandine Railway, that perhaps would be the highest ones we have. Be sure that I'll do all in my power to realize the idea.

I have just now read that the railway will be finished in 1892, and so we can dispose of the time necessary to exchange ideas and to prepare everything in the best way possible.

In my opinion, this matter comprises two questions :—

(1.) How to get observers.

(2.) How to get instruments.

As for instruments, I think it will be without great difficulty to have them. I hope my influence in our Academy is sufficient to get some money for buying a few sets of instruments or one set of cheap registering apparatus. (That would depend on the height and topographic situation of the railway stations.)

More difficult it seems to me to find the persons capable and disposed to make the observations or to attend the automatic instruments. I am of opinion that the only persons we may depend upon are the regents or officers employed in those railway stations, and in this respect, I think you are able to do more than we, and we cannot miss your energetic help.

The resolution of the problem consists in having the Railway Directory's promise to help us, either by recommending the observations to the servants of the company (but this would be of little use in South America), or by obliging them to make observations.

You know the company is an English one. If the Royal Meteorological Society and perhaps the Royal Society or other learned societies interested in our matter took the initiative, carrying through a resolution to be handed over to the company by the intermedium of Her Majesty's Ambassador at Buenos Aires, if the Argentine and Chilian societies seconded this step by analogous motions, I hope the weight of these resolutions would be so great as to attain our aim.

The resolution must contain a brief exposé of the importance of high-level stations in general, and particularly of those in the Cordilleras that form a barrier against the atmospheric circulation east and west the Andes, and must summon the company to do something by making meteorological observations obligatory in its railway stations.

I hope you will agree with me that this question is not only of local, but of universal scientific importance, and I should be very glad to hear your opinion about my proposal.

By the same mail you will receive a circular containing a good news. I have been able to conquer a large territory (two-thirds of the area of Great Britain) for systematic climatological exploration under my direction. I have ordered instruments for 40 stations, 15 of second order, 10 of third order (dry and wet-bulb thermometers, extreme thermometers, rain-gauge, clouds and wind), 15 of fourth order (maximum and minimum thermometer, rain-gauge, clouds, wind). This system of stations is sustained by the Government of the Province (State) of Córdoba, whilst that of Mr. Gould, directed actually by Mr. Davis, is an institute of the National (Central) Government.

This step of a State Government in South America is without example till now, and is worthy of the highest praise on the part of meteorologists. The observers are obliged ones : the telegraphers and schoolmasters of the State Government. I hope to get, by degrees, a hundred stations. Till now, we have had only two stations in all the State : Córdoba and Rio Cuarto.

Yours, &c.

Robert H. Scott, Esq., (Signed) OSCAR DOERING.
London.

It was resolved that the above letter should be shown to Mr. John Ball, F.R.S., at whose suggestion the letter of February 28, 1887, had been written.

Mr. Scott reported that Captain Toynbee had suggested that as the present agent at Southampton, Mr. Permain, was not very active, it might be desirable to correspond with Captain Duncan Forbes, a teacher of navigation at that port, with a view to his undertaking the agency duties.—Approved.

Reported—That, by the Chairman's directions, Mr. Whipple had been instructed to maintain the telegraphic line for cloud camera observations for another year (P.C. 511).

Read—Letter 495 from Mr. Whipple, advising the transmission of the electrogram tabulations for Kew, requested Minutes, 1885, p. 101. Mr. Stone was requested to examine the data.

Submitted—The following report on the forecasts for February 1888 :—

The letters used have the following signification :—

a complete success.
b partial (*i.e.*, more than half) success.
c partial failure.
d total failure.

FEBRUARY.

3.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	40	40	40	78
"	b	36	40	38	
"	c	16	12	14	
"	d	8	8	8	
Scotland, E.	a	40	40	40	82
"	b	48	36	42	
"	c	8	8	8	
"	d	4	16	10	
England, N.E.	a	28	40	34	72
"	b	48	28	38	
"	c	4	12	8	
"	d	20	20	20	
England, E.	a	38	44	41	82
"	b	54	28	41	
"	c	4	12	8	
"	d	4	16	10	
Midland Cos.	a	48	48	48	82
"	b	36	32	34	
"	c	8	16	12	
"	d	8	4	6	
England, S.	a	40	60	50	84
"	b	44	24	34	
"	c	16	16	16	
"	d	0	0	0	
Scotland, W.	a	60	32	46	76
"	b	24	36	30	
"	c	8	28	18	
"	d	8	4	6	
England, N.W.	a	48	52	50	76
"	b	32	20	26	
"	c	8	24	16	
"	d	12	4	8	
England, S.W.	a	48	48	48	82
"	b	40	28	34	
"	c	8	16	12	
"	d	4	8	6	
Ireland, N.	a	52	56	54	80
"	b	20	32	26	
"	c	20	4	12	
"	d	8	8	8	
Ireland, S.	a	64	60	62	84
"	b	16	28	22	
"	c	16	8	12	
"	d	4	4	4	

8.30 P.M.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success a + b.
Scotland, N.	a	35	52	44	85
"	b	52	31	41	
"	c	3	14	9	
"	d	10	3	6	
Scotland, E.	a	45	41	43	78
"	b	31	38	35	
"	c	14	14	14	
"	d	10	7	8	
England, N.E.	a	52	52	52	84
"	b	28	35	32	
"	c	10	3	6	
"	d	10	10	10	
England, E.	a	45	52	49	85
"	b	45	28	36	
"	c	10	3	7	
"	d	0	17	8	
Midland Cos.	a	48	45	47	83
"	b	28	45	36	
"	c	21	7	14	
"	d	3	3	3	
England, S.	a	42	66	54.	88
"	b	41	27	34	
"	c	17	7	12	
"	d	0	0	0	
Scotland, W.	a	45	41	43	78
"	b	41	28	35	
"	c	7	21	14	
"	d	7	10	8	
England, N.W.	a	59	48	54	81
"	b	24	31	27	
"	c	10	14	12	
"	d	7	7	7	
England, S.W.	a	41	55	48	88
"	b	52	28	40	
"	c	7	14	11	
"	d	0	3	1	
Ireland, N.	a	59	52	56	83
"	b	24	31	27	
"	c	14	17	16	
"	d	3	0	1	
Ireland, S.	a	66	52	59	87
"	b	21	35	28	
"	c	10	10	10	
"	d	3	3	3	

SUMMARY.

British Isles	a	46	47	47	80
"	b	36	30	33	
"	c	11	14	12	
"	d	7	9	8	
British Isles	a	49	51	50	84
"	b	35	32	34	
"	c	11	11	11	
"	d	5	6	5	

Submitted the following:—

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the last Meeting of the Meteorological Council, naming the Day and Hour of Issue, the Coasts warned, the Signals hoisted, the Gales experienced (with the approximate time of their occurrence), and the Result, as to the Character of the Warning.

1. WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any), and Approximate Time of occurrence.	Result.* Character of Warning.
1888.				
Feb. 24th, 10.0 a.m.	England, S. (Dover only).	North cone	Moderate gale from E., evening of 24th.	B
" "	" S.E.	"	" " "	B
" "	" E.	"	Moderate to fresh gale, night of 24th.	A
Feb. 25th, 7.15 p.m.	Ireland, S. (except Galway).	North cone	Neither gales nor strong winds	C
" "	" E.	"	" " "	C
" "	England, N.W.	"	" " "	C
" "	" W.	"	" " "	C
" "	" S.W.	"	Strong N.Ely. winds, on 26th	B
" "	" S.	"	" " " (gale on French side of Channel).	B
" "	" S.E.	"	Moderate to fresh gale, N.E., on 26th.	A
March 3rd, 7.40 p.m.	Scotland, E.	North cone	Fresh gale from N.W. or N., night of 3rd–4th.	A
" "	England, S.E.	"	Neither gales nor strong winds	C
" "	" E.	"	Strong winds and moderate gales from N.W., on 4th.	B

* A = complete success (*i.e.* justified by gales of force 8 or more by Beaufort's scale).
B = partial " (" strong winds, force 6 or 7 ").
C = failure (*i.e.* not justified by either gales or strong winds).

SUMMARY.

A - - - - = 3
B - - - - = 5
C - - - - = 5

FREDC. GASTER.

Telegraphic Branch,
7th March 1888.

Submitted—The following statements of work during February 1888:—

MARINE ROOM.

March 6, 1888.

Examined 14 new logs.

North Atlantic Weather Charts.

Preparing the remainder of the reduced charts for reproduction by lithography. Charts to August 28, 1883, forwarded to the lithographer. Proofs of sheets to July 11 received, and to June 6 passed for press.

General.

Discussion of the cyclones in the Arabian Sea and neighbourhood in May and June, 1885.
Discussion of Red Sea data.
Indexing data in ocean 10° squares.
The female branch chiefly engaged on the charting of currents in the North and South Atlantic.

(Signed) CHAS. HARDING.

The Marine Superintendent.

Forwarded for the information of the Council.

(Signed) HENRY TOYNBEE.

TELEGRAPHIC (FORECAST AND STORM WARNING) BRANCH (to 29th February 1888).

Monthly Weather Report:—

1887. *January*, revised and ready for "press;" *February* being revised*; *March* to *December*, as hitherto.

1888. *January*. Tables and rough charts ready; letterpress being written at home. *February*, well in hand.

Weekly Weather Report, 1888:—

Issued to date. We are now issuing in each number the reports which had not been received in time to appear promptly in the previous week's issue.

Appendices are all in hand and well up to date.

Daily Weather Report:—

Issued to date. Corrections, additions, and monthly summary for January—issued.

Checking of Daily (3.30 p.m. and 8.30 p.m.) *Forecasts*.—Complete to date.

Checking issue of Storm Warnings.—Done to date.

Plotting of American Daily Weather Telegrams (received through Paris).—Done to date.

Investigation as to Prevalence of Fog on our Coasts.—In progress.

Calculation of Daily Mean Temperatures of Air (8 a.m. max. and min.) for each month at our Telegraphic Reporting Stations, for years 1871–85.—Completed for January and March, and nearly complete for the other months.

(Signed) FREDC. GASTER.

PANTAGRAPH ROOM.

March 1, 1887.

Observatory Returns.—The various means for July 1885, together with the hourly vapour tension values, completed, and the Hourly Readings copied and sent to press. Proof of "Hourly Readings" for June 1885 has been read and revised, and Part II. signed for press.

Quarterly Weather Report.—The Monthly Weather Charts for Part III., 1879, have been completed, and the General Summary for the quarter commenced. The chart plates for Part I., 1880, have been begun.

Harmonic Analyser.—The analysis of the barograms for 1879 has been completed for three observatories. Two or three experimental curves have been passed through the machine for Mr. Buchan.

Miscellaneous.—Rather more time than usual has been occupied on sunshine returns, and during the first half of the month I was chiefly engaged on the Report of the Krakatoa Committee. The latter work is now quite finished as far as this Office is concerned.

(Signed) R. H. CURTIS.

R. H. Scott, Esq., F.R.S.

EXAMINATION ROOM.

March 1, 1887.

Examinations.

February, 1886.—Completed.

March, 1887.—Completed.

Weekly examination (on receipt) of curves and documents from all stations.

Reports, &c.

February and *March* 1886:—*Notes of Errors* to Aberdeen, Armagh (*anemograms*), Falmouth, Kew (*anemograms*), and Valencia, and reports thereon to Council.

Investigations and report *re* differences between the records by the Beckley and check gauges at Falmouth.

Miscellaneous.

Sorting curves and documents from all stations, January to December, 1887.

(Signed) T. E. ALLEN.

Reported—That the following cheques had been drawn for the month of February:—

1888.		£	s.	d.
Feb. 4th.	J. S. Harding, junr., for payment of weekly salaries -	16	16	8
„ 11th.	„ „ „ -	15	5	0
„ 18th.	„ „ „ -	15	5	0
„ 21st.	Paris M.O., telegrams - - - - -	†4	5	7
„ 22nd.	Pall Mall Coal Company, coals - - - -	6	6	0
	Carried forward - -	£57	18	3

* Since completed, and March advanced considerably.

† Paid by draft on a foreign banker.

1888.		£	s.	d.
	Brought forward	57	18	3
Feb. 22nd.	Postmaster General, private wire	22	0	0
,, ,,	J. Putt, Prawle Point telegraphist	2	12	0
,, ,,	R. Strachan, aneroid bought on commission	4	11	6
,, 25th.	J. S. Harding, junr., for payment of weekly salaries	15	5	0
,, 28th.	Paris M.O., U.S. telegrams	*7	14	6
,, 29th.	R. H. Scott, Secretary	66	13	4
,, ,,	J. S. Harding, jun. — Office salaries	27	15	6
,, ,,	T. D. Bell — Office salaries	15	16	8
,, ,,	J. Sheerman, salary (harmonic analysis)	10	16	8
,, ,,	J. E. Cullum, salary (Valencia Observatory)	18	15	0
,, ,,	R. H. Curtis — Salaries (discussion, &c. of observations).	22	18	4
,, ,,	J. A. Curtis — Salaries (discussion, &c. of observations).	18	6	8
,, ,,	T. E. Allen — Salaries (discussion, &c. of observations).	16	13	4
,, ,,	C. H. Thompson — Salaries (discussion, &c. of observations).	12	10	0
,, ,,	S. Call — Salaries (discussion, &c. of observations).	11	13	4
,, ,,	R. G. Canham — Salaries (discussion, &c. of observations).	7	10	0
,, ,,	A. H. Bell — Salaries (discussion, &c. of observations).	7	10	0
,, ,,	L. H. Powers — Salaries (discussion, &c. of observations).	4	11	8
,, ,,	F. Gaster — Salaries (preparation, &c. of Weather Reports).	25	15	7
,, ,,	F. J. Brodie — Salaries (preparation, &c. of Weather Reports).	18	5	7
,, ,,	G. G. Francis — Salaries (preparation, &c. of Weather Reports).	17	16	3
,, ,,	A. J. Rigby — Salaries (preparation, &c. of Weather Reports).	17	6	10
,, ,,	R. Sargeant — Salaries (preparation, &c. of Weather Reports).	12	3	9
,, ,,	A. R. Simpkins — Salaries (preparation, &c. of Weather Reports).	10	6	3
,, ,,	C. W. Heinemann — Salaries (preparation, &c. of Weather Reports).	5	0	0
,, ,,	Capt. H. Toynbee — Salaries (discussion, &c. of observations and care of instruments).	33	6	8
,, ,,	Nav.-Lieut. C. W. Baillie, R.N. — Salaries (discussion, &c. of observations and care of instruments).	22	18	4
,, ,,	R. Strachan — Salaries (discussion, &c. of observations and care of instruments).	27	15	6
,, ,,	C. Harding — Salaries (discussion, &c. of observations and care of instruments).	22	18	4
,, ,,	H. Harries — Salaries (discussion, &c. of observations and care of instruments).	15	0	0
,, ,,	W. Allingham — Salaries (discussion, &c. of observations and care of instruments).	15	0	0
,, ,,	W. G. James — Salaries (discussion, &c. of observations and care of instruments).	11	5	0
,, ,,	F. T. Bullen — Salaries (discussion, &c. of observations and care of instruments).	9	3	4
,, ,,	R. F. Wallace — Salaries (discussion, &c. of observations and care of instruments).	8	15	0
,, ,,	Bank of England; sale of Stationery Office forms	5	6	10
,, ,,	J. E. Cullum, expenses	12	15	3
,, ,,	F. Gaster, for payment of allowances for extra attendance	15	11	5
,, ,,	De La Rue & Co., sunshine cards	7	3	7
,, ,,	W. N. Shaw, honorarium	50	0	0
,, ,,	J. S. Harding, jun., petty cash	50	0	0
,, ,,	Hamburg M.O., Recknagel's anemometer	*5	18	0
		£771	3	3

* Paid by draft on a foreign banker.

116, *Victoria Street, March* 21, 1888.

PRESENT:

LIEUT.-GENERAL STRACHEY IN THE CHAIR.

MR. BUCHAN.	MR. GALTON.
PROFESSOR DARWIN.	MR. STONE.

THE HYDROGRAPHER.

The Secretary was in attendance.

The Minutes of the last meeting (March 7) were read and confirmed.

Read—A letter (No. 652) from the Directors of Ben Nevis Observatory, containing an extract from their Minutes, which concludes thus:—

"As regards the concluding clause of the letter, that the Meteorological Council will take an early opportunity of addressing them again on this subject, the Directors beg to inform the Council that they have been awaiting the receipt of this letter, and that until it is received they do not see that there is anything in the letter of 23rd November which called for an answer."

The Chairman was requested to prepare a draft reply for consideration.

Read—Letters 582 and 616 from Professor Wild and Professor Mascart respectively, asking for an opinion as to the desirability of convening a Meteorological Congress in Paris in 1889, or of holding a meeting of the International Meteorological Committee in 1888 or 1889.

Mr. Scott was instructed to reply that in the opinion of the Council it would not be advisable to convene a Congress, but that there would not be much difficulty in organising a meeting of the Committee (P.C. 660).

Read—The following letter:—

(M.O. 675.)

Meteorological Office, 116, Victoria Street,
London, S.W., November 30, 1887.

GENTLEMEN,

As I have already intimated, I have a wish to retire, and probably this is the most convenient time for me to bring the subject to your notice. In January 1888 I shall have completed 21 years' service in this Office, and if convenient to you I should like to retire during the summer of that year.

I am sorry to say that my circumstances will not permit of my retiring unless you are able to grant me a pension, which I hope you will see your way to doing. My retirement will break a very happy connexion with all my fellow workers in the Office, in whom, and in whose work I shall take great interest as long as I live.

I am, &c.
(Signed) HENRY TOYNBEE.

The Chairman and Council of the
Meteorological Office.

It was resolved that Captain Toynbee's resignation be accepted with much regret, and that a pension of 144*l.* per annum be allowed to him from July 31.

It was further resolved that Lieutenant Baillie be promoted to the post of Marine Superintendent on Captain Toynbee's retirement, at a salary of 350*l.* per annum.

Read—A memorandum from Captain Toynbee reporting that since the last meeting six logs had been received, three of them being "excellent."

Observer.	Ship.	Period.	Voyage.	Last mention on Minutes.
Capt. S. Dark	"Blairgowrie"	May 16, 1887—March 7, 1888.	Liverpool to Calcutta and Dundee.	1887, p. 16.
Capt. W. L. Rosseter	Barque "British Nation."	Jan. 1—March 7, 1888.	Demerara to Delaware and Liverpool.	1887, p. 120.
Capt. N. J. Wheaton	Barquentine "Eliza."	Oct. 3, 1887—Feb. 19, 1888.	Liverpool to St. Domingo and home.	1887, p. 49.

Mr. Scott was instructed to convey the best thanks of the Council to the above observers.

Submitted—The following :—

LIST of STORM WARNINGS issued to the COASTS of the BRITISH ISLANDS since the last Meeting of the Meteorological Council, naming the Day and Hour of Issue, the Coasts warned, the Signals hoisted, the Gales experienced (with the approximate time of their occurrence), and the Result, as to the Character of the Warning.

(1.) WARNINGS ISSUED.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result.* (Character of Warning.)
1888.				
March 7th, 3.20 p.m. -	Ireland, S. -	South cone	Fresh gales from Swd., on 8th -	A
„ „ -	„ E.† -	„	Fresh gales from S.Wd., morning of 9th.	A
„ „ -	England, N.W. -	„	Fresh to strong S.Wly. gales, on 9th	A
„ „ -	„ W. -	„	Moderate S.Wly. gales, on 9th -	B
„ „ -	„ S.W. -	„	„ „ „ -	B
„ „ -	„ S. (Channel Islands and Southampton).	„	Moderate to fresh gales from S.W., on 9th.	A
March 8th, 9.50 a.m. -	Scotland, E. (Dunrossness and Wick).	South cone	Neither gales nor strong winds -	C
„ „ -	„ W.† -	„	Moderate Sly. gale, evening of 8th -	B
„ 7.15 p.m. -	„ E. (excepting Dunrossness and Wick).	„	Neither gales nor strong winds -	C
„ „ -	England, S. (Portsmouth to Dover).	„	Fresh gales from S.W., evening of 9th.	A
„ „ -	„ S.E. -	„	„ „ „	A
„ „ -	„ E.† -	„	Strong winds from S.W., night of 9th.	B
March 11th, 9.20 a.m. -	England, S. -	South cone	Strong to whole gale from S.W. and W.,‡ on 11th.	A
„ „ -	„ S.E. (mouth of Thames).	„	„ „ „	A
„ 9.30 a.m. -	Ireland, E. -	North cone	Wind moderated after issue of warning.	C
„ „ -	Scotland, E. -	„	Moderate to fresh gale from S.E. on evening of 11th.	A
„ „ -	„ W. -	„	Fresh N.Ely. gale, evening of 11th -	A
„ „ -	England, N.W. -	„	Wind moderated after signals were hoisted.	C
„ „ -	„ W. -	„	Strong N.Wly. gale, late on 11th -	A
„ „ -	„ S.E. (excepting mouth of Thames).†	„	Apparently strong Wly. gales on 11th.	A
„ „ -	„ E. -	„	Moderate Ely. and N.Ely. gales, evening of 11th.	B
March 12th, 3.45 p.m. -	Ireland, S. - -	South cone	Strong Ely. and S.Ely winds, night of 12th and morning of 13th.	B
„ 5.15 p.m. -	England, S.W. -	„	Strong S.Wly. winds, on 13th	B
March 13th, 10.25 a.m.	Ireland, E. -	„	Moderate S.Ely. gales, early on 15th	B
„ „	England, N.W. -	„	Moderate Ely. and S.Ely. gales, night of 13th.	B
„ „	„ W. -	„	Wind moderated after issue of warning.	C

This depression filled up on reaching the Irish Sea. Its appearance was very bad when advancing.

* A = complete success (*i.e.* justified by gales of force 8 or more by Beaufort's scale).
B = partial success („ „ strong winds, forces 6 or 7 „).
C = failure („ not justified by either gales or strong winds).

† Information at present available for these coasts insufficient to give reliable results.

‡ These warnings were probably rather too late to be of much service. The depression was very deep, but there was no indication of its approach at 6 p.m. on the 10th.

Day and Hour of Issue.	Coasts warned.	Signal hoisted.	Gales experienced (if any), and approximate Time of Occurrence.	Result. (Character of Warning.)
1888.				
March 13th, 7.20 p.m.	England, S. -	South cone	Neither gales nor strong winds -	C
„ 7.35 p.m.	Scotland, E. -	North cone	Fresh to strong S.Ely. gales, on 14th.	A
„ „	„ W.† -	„	Fresh gale from Ewd., evening of 15th.	A
„ „	England, S.E. -	„	Moderate gale from S.E., morning of 14th.	B
„ „	„ E. -	„	Fresh Ely. and S.Ely. gales, on 14th and 15th.	A
March 15th, 10.20 a.m.	Ireland, E.† -	North cone	Fresh Ely. gale, night of 15th -	A
„ „	England, N.W.† -	„	Strong N.Ely. wind, on 16th -	B
March 16th, 10.36 a.m.	England, S.E. -	North cone	Fresh N. gale, early on 17th -	A
„ „	„ E. -	„	„ „ „ -	A
March 18th, 7.30 p.m. -	England, S.W. -	North cone	Moderate N.Ely. gales, 19th and 20th.	B
„ „ -	„ S. -	„	Fresh N.Ely. gales, 19th - -	A
„ „ -	„ S.E. -	„	„ „ - -	A
„ „ -	„ E. (Humber to Wash).	„	„ „ - -	A
March 19th, 10.30 a.m.	Ireland, E. -	North cone	Neither gales nor strong winds -	C
„ „	England, N.W. -	„	Strong N.Ely. winds, evening of 19th.	B
„ „	„ E. (Tweed to Humber).	„	Neither gales nor strong winds -	C

† Information at present available for these coasts insufficient to give reliable results.

SUMMARY.

Total number of warnings issued - - - - -	42
Number of successful warnings (A + B) - - - -	34
Number of failures (C) - - - - - -	8

(2.) GALES EXPERIENCED FOR WHICH NO WARNING WAS ISSUED.

There was one only, viz., that which occurred on our S.Wn. coasts on the 11th. There was no indication whatever at 6 p.m., 10th, of the approach of bad weather, but at 8 a.m. a deep depression was found near Pembroke. The question is under examination.

(Signed) FREDC. GASTER.

Telegraphic Branch,
21st March 1888.

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Printers to the Queen's most Excellent Majesty.
For Her Majesty's Stationery Office.
[413.—25.—4/88.]